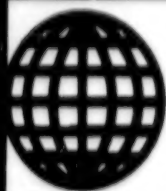


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6 February 1995



**FOREIGN
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JPRS Report

Central Eurasia

***Military Affairs
Military Digest
No 5, November 1994***

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Central Eurasia

Military Affairs

Military Digest

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CONTENTS

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[The following are translations of selected articles from ARMEYSKIY SBORNIK [Military Digest], a monthly journal of the Ministry of Defense.]

Missile Propellant and Fuel Directorate Chief Interviewed [Lt-Gen P. Gorupay; pp 2-7] 1

THE ARMY: PROBLEMS, SOLUTIONS

So as Not To Leave the Sky 'Untended' [Col S. Volkov and Col (Res) Yu. Kovtunenkov; pp 8-10] .. 4

Reconnaissance Has the First Say: Will Its Priority in Combat Support of the Russian Air Force
Be Preserved? [Col G. Budzinskiy and Lt Col V. Palagin; pp 14-17] 6

Military Transport in the Far North: Prospects Cause No Joy [Capt-Lt O. Izotov; pp 18-21] 8

COMBAT TRAINING

Platoon Defense Alignment [A. Denisov and N. Shishkin; pp 22-26] 10

Forcing Water Obstacles [Col A. Nazarov and Lt Col V. Bezgin; pp 27-31] 15

And Tanks 'Come Alive' [Col A. Petrov; pp 34-35] 18

A Sociologist's View [Lt Col S. Burda; pp 36-39] 20

Again About Security of Our Posts [Col S. Leonenko; pp 44-48] 23

EQUIPMENT AND ARMAMENT

Everything That Burns Will Do [Col G. Shcherbakov and Maj G. Saad; pp 52-55] 26

MILITARY SCHOOL: DEVELOPMENT AND PROSPECTS

Education of Communicators Is Competitive [Lt Gen G. Savin; pp 56-60] 29

What Did the Research Show? [Maj I. Obratsov; pp 61-65] 31

Precision Weapons: An Alternative to Nuclear Weapons? [L. Malyshev; pp 70-73] 34

Msta-S Self-Propelled Howitzer [p C4] 36

Articles Not Translated From ARMEYSKIY SBORNIK No 5, November 1994 [p 1] 37

Publication Data 37

Missile Propellant and Fuel Directorate Chief Interviewed

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[Interview with Lieutenant-General Pavel Ivanovich Gorupay, chief of Russian Federation Ministry of Defense Central Missile Propellant and Fuel Directorate, by Colonel (Reserve) Rafeat Chekmarev, date, place and occasion not specified; photograph of Gorupay included]

[FBIS Translated Text]

Calling Card

Lieutenant General Pavel Ivanovich Gorupay was born in the village of Loymola (Karelia) in June 1950. He completed Ulyanovsk Military-Technical School imeni Bogdan Khmel'nitskiy in 1970, the Missile Propellants and Fuel Engineering Faculty of the Military Academy of Rear Services and Transportation in 1977 and the Russian Federation Armed Forces General Staff Military Academy in 1992.

In the troops he performed duties in various rear services positions from chief of special propellant and POL supply of a SAM regiment to deputy army commander for rear services. He served in the Northern Group of Forces, Far East Military District, Group of Soviet Forces in Germany and Leningrad Military District.

He was appointed to the position of chief of the Russian Federation Ministry of Defense Central Missile Propellant and Fuel Directorate in December 1992.

He is married and has a son.

[Chekmarev] Pavel Ivanovich, there is an atypical feature in your Army biography: a week's TDY to the United States as part of a Russian Federation Ministry of Defense delegation. You will agree that your predecessors who headed the Central Missile Propellant and Fuel Directorate, the very name of which appeared in the pages of the Russian press for the first time only in 1992, probably did not even dream of such a thing in view of the "secrecy"... Could you briefly set forth your impressions of that evidently memorable trip for ARMEYSKIY SBORNIK readers?

[Gorupay] The trip really did stick in my memory and was very useful. We had an opportunity to see with our own eyes that America holds the view that money needs to be counted. Its Armed Forces also respect the dollar. Saving money is a priority for support services, including the fuel service. And do you know what I believe deserves respect and careful study? Above all the resolute mood of this service's specialists for reducing the costs which impede the common cause and attainment of success in a particular specific sector of work.

Previously the former USSR Armed Forces essentially had no knowledge of financial problems. The important thing was to "dislodge" funds, which the Goskomnefteprodukt [State Committee for the Supply of Petroleum Products] dependably supplied. But a market economy ties monetary and material resources together in the closest way: if there is money, the appropriate organization will have fuel for the troops, special equipment and all the rest... Today we have a lot of cherished dreams with respect to accomplishing an economic harmonization, so to speak, of the fuel service. I will mention just one of them: forming a transportation-depot system which will permit making the delivery of fuel to consumers less expensive, including through wide use of relatively inexpensive pipeline transportation.

In focusing attention—by no means accidentally—on the Americans' constant concern for economy, I wish to emphasize that they do not pursue immediate profit. It probably is American pragmatism that safeguards the U.S. Defense Fuel Supply Center against rash reductions. The fact is that any work sector that is at first glance insignificant and that has been left ownerless generates complicated problems in the future whose solution costs considerably more than the pay of a corresponding specialist. Above all this concerns interaction with the market. Up to 45 percent of Defense Fuel Supply Center personnel keep a finger on its pulse, figuratively speaking (by the way, there are six times more personnel in this Center than in our Central Missile Propellant and Fuel Directorate).

Another point is of no less importance. It comes down to a search—both by us as well as them—for the most effective methods of accomplishing tasks of providing troops with everything necessary. The Americans gradually are reforming the organizational structure and legislative base in the direction of greater centralization. This is their strategy... But if there is a trend toward centralizing management of support to the Armed Forces with such a developed market economy, what can be said about us? I am firmly convinced that until the Russian economy, which is entangled in confusion, completely stabilizes and until a "normal" market forms, POL deliveries to troops and naval forces must be primarily centralized.

To briefly depict the present fuel situation in the country, it can be said unequivocally that it is most severe! What causes this? There are many reasons. The rust of a deep crisis gradually is eating away at the fuel-energy complex and transportation of Russia, on whose territory there is an insufficient number of oil refineries, and in my view not very well situated. The last federal petroleum product supply agency, the Rosnefteprodukt concern, departed this life, as they say. We have a rupture of traditional economic ties and lack of development of a market infrastructure. Border and customs barriers with the near abroad are doing their negative "bit." It remains to add to this ball of problems the very acute shortage of budgetary funds, a scandalous confusion in price formation and clumsiness of the financing system, and I believe the picture is extremely clear.

So our service's specialists have to work in that kind of complicated situation. Frankly speaking, the number of people in fuel service agencies has been brought to a critical limit today because of ill-conceived reductions. As a comparison, logistic support units and subunits in armies of the most developed states comprise up to 40 percent of overall armed forces numerical strength, but our rear services have been curtailed to the point of indecency, since they comprise less than 3 percent...

[Chekmarev] You spoke of the upcoming formation of a transportation-depot system, one of the important components of which is to be wide use of pipeline transportation. Does this mean that in time a "big pipe" will effectively operate directly to the troops as in Western Europe, for example, where a rather far-flung network of military and commercial pipelines already has been created that dependably supplies NATO military forces with fuel?

[Gorupay] That probably is how it will be. Until recently our service placed main reliance on railroad transportation in day-to-day support to the troops. The arrangement has been worked out over decades: fuel was delivered from oil refineries by rail to district transport and depot distributing points, or directly to the largest consumers. Then petroleum products were delivered to units and establishments by motor transport. This arrangement functioned almost faultlessly and permitted—and even now permits—supporting Army and Navy combat training and economic activity with fuel without appreciable interruptions. But the present economic situation and reduction in defense appropriations forces us to regard each ruble even more carefully and to seek ways to rationalize the supply process. Hence the cherished dream of getting right down to solving the problem of using fixed petroleum products pipelines (abbreviated NPP) specifically in support of the troops.

The advantages of pipeline transportation would appear to be obvious: high reliability and continuity of the transportation process, possibility of full mechanization and tele-automation of work, its relatively low labor-intensiveness, and—very important, specifically today!—relatively low production cost.

It cannot be said that we are "discovering America" here, since Russia also has its own pipeline-depot infrastructure for supplying petroleum products. It was only that up until recently for some reason its activation was envisaged only for a special period of time. In the aggregate with military field fuel depots, it was conceived as a unified pipeline-depot system which will permit delivering fuel from the interior of the country to theaters of military operations and dispersing and maneuvering its supplies. True, at various times certain of our fuel depots and bases were connected to main petroleum products pipelines, but unfortunately the "big pipe" for now has not reached the troops themselves, airfields and ship basing facilities... Moreover, the fact must be taken into account that deliveries over petroleum products pipelines presume the recipients' close

interworking with petroleum products pipeline management agencies and payments for services and for the fuel itself, i.e., they require a certain legal and financial independence of depots and bases. But the fact is that these are the very elements of decentralization which the previous supply system swept aside without a trace.

A decision was made in the early 1990's to make a transition to supplying the Russian Armed Forces with fuel on a territorial principle. Life confirmed the correctness of the choice. At the same time, taking into account that the fuel supply system must fit more integrally into the overall rear services system being established at the present time, also on a territorial principle, we concluded that it is advisable to transfer functions of territorial fuel supply centers previously established in military districts and fleets to the territorial logistic support area centers after fuel departments are formed in them. It will be necessary to subordinate promptly all personnel and assets of our service within a particular area to the fuel department of the territorial logistic support area center. It is the personnel of this department who are to organize their precise, uninterrupted work and be responsible for their activity and status.

It can be said with respect to territorial supply centers that they were the ones which gave the "green light" to wide-scale use of pipelines.

[Chekmarev] But railroad services probably will have to be used for more than a single year yet?

[Gorupay] Of course! We do not at all intend to reject railroaders' services, especially as it is planned to accustom petroleum products pipelines to troop support in stages, finding the optimum option of the transportation operation for each recipient. When this unified system is formed (from petroleum products production sites via territorial logistic support area centers to military units), by our estimates it will permit delivering up to about 70 percent of districts' overall requirement for automotive gasolines and diesel fuel. Transporting jet fuel over main petroleum products pipelines also is realistic in the Moscow and Siberian military districts in the near future, and it will become possible in the North Caucasus, Volga and Ural military districts after construction of kerosene pipelines is completed.

[Chekmarev] Pavel Ivanovich, no small amount of fuel is expended in the Armed Forces for combat training and for keeping troops and naval forces in a high condition of combat readiness. Evidently here is where reserves must be sought for economizing on petroleum products that go up in price each year?

[Gorupay] Yes, no small amount of fuel can be saved in the course of day-to-day combat training, above all through its rational use. I believe that those commanders act very sensibly who constantly maintain the necessary set of combat training vehicles in training centers to which subunits are delivered in turn for working appropriate missions and exercises.

It is difficult to overestimate the importance of simulators and other modern technical training equipment, with the help of which it is possible to accomplish with least expenditures the individual training of personnel who directly operate the equipment. By the way, much depends specifically on skillful control of it. Experiments have shown that differences in fuel consumption for different drivers on one and the same motor vehicle reach 30 percent or more with conditions being equal. In the Air Force specific norms for simulator "flying hours" have been established for each pilot in accordance with his qualification, which permits saving 20-25 percent of aviation fuel. Technical training equipment also is rather effective for upgrading the skills of tankers, motor transport personnel, ship specialists and soldiers of other professions. Thus, using a BMP driver simulator for training cadets permits saving 150 tonnes of fuel and 12 tonnes of lubricating oils in a year.

To my great regret, far from everywhere do commanders and staff officers show proper concern for developing the training facility and introducing simulator systems. There have been instances where flight simulators that have been obtained with difficulty and which already have come to the troops have waited for months to be placed in operation...

[Chekmarev] You know of course that more and more attention is being given of late to integration of classes and to joint training against a common tactical background and in an extreme situation for personnel of different combat arms subunits such as for aviators and navymen and for motorized riflemen, tankers, artillerymen and combat engineers. As an experienced professional, what would you advise young commanders of interworking units?

[Gorupay] Above all, in my view a maximum of attention must be devoted to preparing for an upcoming problem or exercise. Everything has to be calculated and planned in advance (neglect nothing!), the list of vehicles to be taken into the field and actually necessary for full rehearsal of assigned missions has to be determined, the vehicle resources to be released and the fuel consumption limit must be approved, the most economical methods of delivering the vehicles has to be planned, and a detailed, element by element rehearsal of exercise participants' actions has to be conducted using installations of the logistic and technical support facility.

Only with such scrupulous preliminary preparation by each commander is it possible to have no doubt that fuel will be expended with maximum effectiveness.

[Chekmarev] Pavel Ivanovich, while travelling on official business, I and my journalist colleagues automatically noticed the following undesirable trend: for some reason troops have begun to show less concern for checking the serviceability of vehicles leaving their motor pools on a run, and the quality of unit checkpoint control also clearly is on the decline. What can you say on this score?

[Gorupay] It is clear even to a person inexperienced in equipment that checking the serviceability of vehicles being dispatched on a run is an indispensable condition not only for traffic safety, but also for economical consumption of fuel, and lubricants. The fact is that essentially all vehicle systems and hardware have great importance in the amount of their consumption. There is a direct dependence here: if attention to this matter has let up of late, overconsumption of fuel has grown.

The following should be added to what has been said: many serious deficiencies are allowed in keeping trip tickets. Often actual consumption is put down as equal to standard consumption. It also would appear to be characteristic that transportation assets are not always refueled immediately when they are placed in the motor pool and actual fuel consumption is not established promptly. POL is inventoried irregularly in subunits. All this of course is an impedance in promptly uncovering facts of fuel overconsumption and of thefts and in taking effective steps to eliminate them.

[Chekmarev] Just what qualities must a unit fuel service chief have in order to successfully counter the negative phenomena you mentioned?

[Gorupay] More than once we have seen that the end result of ensuring rational use of petroleum products largely depends on the competence, initiative and persistence of the service's specialists at different levels. As a rule, there are considerably fewer deficiencies for those chiefs who delve into all aspects of their military collective's life and activity and maintain close job contact with specialists who organize combat training, logistic support of subunits, and vehicle maintenance. In addition, the fuel service chief is obligated to make specific proposals on saving fuel-energy resources, to work together with monitoring agencies, to organize and hold practical study classes with personnel on procedures and methods of saving POL, and to report all violations and unused reserves without exception according to established procedure. Without this, the negative phenomena being observed in the troops nowadays cannot be overcome...

It is also impossible to ignore more frequent facts of a negligent attitude locally toward such a very valuable petroleum product as liquid boiler fuel (heavy fuel oil), which in the Army and Navy is intended basically for communal-everyday needs: heating buildings and structures, meal preparation, bath and laundry service. Many (especially young commanders) for now still work little and unwillingly on questions of its correct, careful expenditure. Therefore instead of using less expensive natural gas, coal or peat in boiler rooms, they often strive to install boilers that operate on liquid fuel. One can only dream about introduction of automation to the operation of boiler plants, installation of devices which monitor heat expenditure, and construction of large boiler rooms and elimination of small, unproductive boiler rooms with obsolete equipment.

One other disturbing circumstance was noted in garrisons involving military units' daily growing debt to power inspection agencies. Let's say they disconnect a military post for nonpayment of debts. We cannot sit around without electricity, thinks the commander, and he immediately makes a decision: bring diesel generators here!.. They do and they run the little engines for days. Will you really have enough fuel with such a negligent attitude toward it?!

[Chekmarev] The brochure "Arguments and Facts," published by the U.S. Defense Fuel Supply Center and presented to you by General Stephen Bliss during the visit to America, reports that their fuel service is performing the task of shifting to JP-8 unified aviation fuel both in Europe as well as in areas of the Pacific, Alaska and the Hawaiian Islands. The advantages of the latter are that it increases safety and dependability of equipment operation and removes ecologic problems. How do things stand with us in this direction, particularly with standardization and reduction in the assortment of POL and special fluids?

[Gorupay] With the involvement of our service's specialists, new, highly effective kinds of fuel have been created which ensure reliable operation of engines in the most modern models of armament and military equipment. Requirements placed on fuels for piston and gas-turbine engines of ground, aviation and naval equipment—gasolines, jet and diesel fuels, fuel oils—were optimized and a unified ship fuel also has been created and tested for the Navy. This permitted improving the use of raw material resources in developing fuels, and without lowering requirements for ensuring combat readiness of military equipment. Questions connected with upgrading oils, plastic lubricants, special fuels and other materials also are constantly in the developers' field of view. They must be versatile, long-working and all-season, which will ensure decreased labor inputs for servicing vehicles and machinery. It is on this basis that the assortment of those materials is being standardized and reduced, time periods for their use in engines are being increased considerably, and losses during replacement are being reduced to a minimum. As a rule, the work done by the service's specialists is permitting the assortment of POL to be reduced 1.5-2 times.

For the sake of fairness it must be noted that such an important process is being delayed to no small extent by a shortage always of that same money (as is, by the way, also the progress of further unification and standardization of our service's technical equipment)...

[Chekmarev] Have we come full circle, Pavel Ivanovich? Nevertheless, life goes on. The 60th anniversary of the Russian Armed Forces Fuel Service is in February 1996. I very much hope that by that time problems will have abated a bit for your subordinates.

Smiling, Lieutenant General Gorupay seemed to sum up our conversation:

[Gorupay] Hardly... For we perform duty in one of the liveliest sectors of support to troops and naval forces,

and so even in the future there certainly will be an excess of problems for each fuel service specialist. It is another thing that we must learn to solve them with fewer costs, more competently, and without disappointing mistakes.

As befitting true military professionals.

THE ARMY: PROBLEMS, SOLUTIONS

So as Not To Leave the Sky 'Untended'

95UM0166B Moscow ARMEYSKIY SBORNIK
in Russian No 5, Nov 94 (signed to press
28 Oct 94) pp 8-10

[Article by Colonel Sergey Volkov, candidate of military sciences, and Colonel (Reserve) Yuriy Kovtunenkov, Air Defense Troops Operational-Tactical Research Center, under rubric "My Opinion on the Subject"]

[FBIS Translated Text] Military reform in the Russian Armed Forces is acquiring more and more concrete outlines. The formation of new troop groupings, including mobile forces, and of the corresponding infrastructure continues. Basic provisions of Russian Federation military doctrine have been adopted for the transition period.

Nevertheless, in our view there are vague and even controversial points, especially in questions of structural (branch) reorganization. In particular, a military-scientific conference held in July 1994 noted that the most promising path is a transition from the existing five-branch structure first to a four-branch structure and, after 2000, even to a three-branch structure (Ground Troops, Aerospace Troops and Navy). Without denying that possibility in principle, we assume, however, that it hardly will be realized successfully in those time periods. First of all, insufficient financing of the Army and Navy and the reduction in their numerical strength impedes this, and an absence of the requisite command and control system and a shortage of skilled cadres has an effect. Secondly, a mechanism for legislative change in the Armed Forces structure has not been worked out and their effective combat strength and the ratio of branches and combat arms has not been substantiated.

It is doubtful that a decrease in the number of the latter will entail a reduction in the command and control apparatus and in defense expenditures, since in our opinion both the command and control system as well as the forms and methods of employing troop groupings for performing combat missions will change with the destruction of the adjusted military mechanism. This will lead not only to a decisive discarding of operational views, but also to significant expenditures. Does this mean the hand again will extend toward the state's pocket?

References to foreign experience also are far from always relevant. For example, can our copying of the U.S. Armed Forces structure lead to the desired results?

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Hardly, inasmuch as this structure is determined by the presence of two types of commands—primarily administrative on U.S. territory and operational basically outside its limits. But for us, combining administrative and operational functions requires a lesser numerical strength of the command and control apparatus and lesser expenditures. In other words, the existing five-branch structure is more economical in this sense.

There is no doubt that there is no time to be lost. Nevertheless, structural reform of the Russian Armed Forces with their simultaneous reduction can lead to undesirable consequences, right up to a decrease in combat and mobilization readiness. Therefore it would be more correct initially to reduce the Army and Navy to the prescribed numerical strength, then gradually shift to the new structure with consideration of scientific grounds and use the existing system in the transition period for command and control of troops (forces) and weapons.

Our opinion is as follows: a determination of the makeup and structure of the Armed Forces must be approached in a more weighed and cautious manner. Each ill-considered step is fraught with considerable losses. We will illustrate this in the example of the Air Defense Troops, which still are a branch of the Armed Forces for now.

The parade of sovereignties and the pulling apart (literally and figuratively) of air defense formations and units in the Transcaucasus and Central Asia led to an actual "opening" of the sky on the country's southern borders. Add to this an absence of treaties for joint air defense with certain CIS countries and the forcible "privatization" of fighter aviation and equipment of SAM and Radiotechnical Troops in "hot spots" and its appearance in extremist circles of the near abroad... All this can have the saddest consequences. This is why it is important for Russia to preserve a unified air defense system. Arguments in its defense are as follows.

First—significant forces and assets are concentrated on the most important axes of operation of the presumed aerospace enemy; the sky has been "registered," as they say. Exercises which have been held by Moscow Air Defense District and by other large strategic formations and formations of the Air Defense Troops have shown their readiness and capability for defending Russia's air borders. Second—the transient, dynamic nature of aerospace operations, engagements and battles required the establishment of sophisticated, costly systems for reconnaissance and for command and control of individual air defense groupings to cover the most important installations and protect the state border. But a separation of SAM Troops and fighter aviation will reduce their combat effectiveness and lead to increased losses of air defense aviation, including from the fire of friendly SAM systems. Moreover, transfer of fighter aviation to the Air Force and of Radiotechnical Troops to the Ground

Troops essentially eliminates the system of air cover for the state border and for strategic installations on the country's territory.

We believe that proposals for "dividing" the Air Defense Troops for the umpteenth time and distributing their forces and assets among other branches of the Armed Forces (particularly among the Ground Troops and Air Force) attest to an underestimation of the role and place of air defense in modern warfare. The unsuccessful reform of the Air Defense Troops in the 1980's, which led to nothing except billions in costs, forces us to speak about this. By the way, large strategic border formations of air defense also were "reorganized" at that time: units of the SAM Troops and Radiotechnical Troops were transferred to military districts and fighter aviation was transferred to air armies. What resulted was an absence of coordination in operations of air defense forces and assets and an absence of responsibility for air defense on the country's entire territory.

An analysis of the experience of wars and military conflicts of recent years, including in the Persian Gulf, shows that the main role in achieving success of a military campaign is set aside for wide-scale use of SVKN [aerospace attack forces]. Without their delivery of damage on the opposing grouping, ground troops do not begin active operations, i.e., we have a shift in the center of gravity of warfare into aerospace. And it is not by chance that the General Staff, with the involvement of main commissariats of branches of the Armed Forces and leading scientific research organizations of the Ministry of Defense, worked out a draft concept for aerospace defense of Russia. Such a defense is not just a deterrent factor for an aggressor. Its high effectiveness creates conditions for strategic deployment of troops in the initial period of military operations.

It seems to us that now it is the Air Defense Troops that are the basis of aerospace defense. In addition, aerospace defense must unite means of reconnoitering the aerospace enemy; missile-space defense and air defense of the Ground Troops, Navy, Air Force and VKS [Aerospace Forces] capable of combating existing and future aerospace attack forces; and information and command and control entities. The aerospace reconnaissance system has to be established based on information assets of reconnaissance of branches of the Armed Forces and other Russian ministries and departments. That system simultaneously will become a component part of the overall system warning of enemy aggression, and consequently all aerospace defense forces will receive unified information in real time.

Separation of missile-space defense and air defense will require creating systems for each of them already today providing for detection and destruction of an enemy operating from outer space into the atmosphere, and in the future [will require] a transition from one sphere into another in the range of mutually overlapping altitudes of 40-120 km (such assets presently are being tested in the

United States). The relationship of air defense and missile-space defense is especially noticeable in creating a point ABM defense system against operational-tactical missile strikes. There are means of engaging such missiles, but they can operate only in the presence of data of necessary depth obtained not only from traditional radars, but also from their space analogues. ABM defense systems of that caliber can be created and used in support of Russian aerospace defense as a whole and will not be given a district scale.

The present air defense system can and must become the basis of aerospace defense also because it is built on a territorial principle, which implies not the interworking of large strategic formations of Air Defense Troops and of air defense forces and assets of military districts, the Air Force and the Navy, as was the case previously, but unified command and control of them in air defense zones and areas. The establishment of corresponding mobile reserves of the Air Defense Troops also is envisaged for a timely buildup of efforts in crisis situations.

In short, we favor preserving the essentially already created system of the country's aerospace defense and deem its breakup into parts to be inadvisable; otherwise it may happen that an aerospace looked after by many "nannies" also will become "untended."

FROM THE EDITORS

In publishing this article, we hope that you, dear readers, will express your opinion concerning Armed Forces structural reform and the place and role of the Air Defense Troops in Russia's aerospace defense system.

Reconnaissance Has the First Say: Will Its Priority in Combat Support of the Russian Air Force Be Preserved?

95UM0166C Moscow ARMEYSKIY SBORNIK
in Russian No 5, Nov 94 (signed to press
28 Oct 94) pp 14-17

[Article by Colonel Grigoriy Budzinskiy, candidate of military sciences, docent, and Lieutenant Colonel Vladimir Palagin, candidate of military sciences; and commentary by Lieutenant General of Aviation Nikolay Rastorguyev, chief of Air Force Intelligence Directorate]

[FBIS Translated Text] *The authors of this article, Colonel Grigoriy Budzinskiy, candidate of military sciences, docent, and Lieutenant Colonel Vladimir Palagin, candidate of military sciences—experienced pilots who work professionally on aerial reconnaissance theory and practice—are forced to ask this question by their concern over the situation which has formed in such an important element of Air Force combat support.*

We know that the defensive direction of Russian Federation military doctrine by no means depreciates the role of reconnaissance in general and of aerospace reconnaissance in particular. It is rather the other way around, for it is reconnaissance, with which, as we will recall, the

first experiments in combat employment of aircraft also are linked, that permits promptly obtaining reliable information, including of a military nature, on the situation in various regions for adequate political decisionmaking by the country's leadership. It also enables mastering the real situation and following the development of events in areas of armed conflicts near the Russian state border. Finally, reconnaissance has been and remains one of the priority kinds of support to combat operations.

Studying the probable enemy has a special place at the basis of training of a reconnaissance pilot, as well as of any military professional. Just quite recently we knew all of our "enemies" without exception, both in the West as well as in the East. Now it is a different situation: if the majority of world countries have not become our allies, they definitely have become partners. But partners also must be known rather well both in the near abroad as well as in the far abroad. We in the military are interested above all in the status and development of their armed forces, basically from the aspect of possible combined operations and a study of experience, but not just that. Therefore a certain abstractness in troop combat training (alas, it sometimes occurs) is inadmissible today.

Local wars of the last three decades persuade us that their outcome depends to a considerable extent on successful air operations. Military experts of all countries recognize this fact, emphasizing the special importance of aerial reconnaissance in winning victory. Meanwhile, the problem of interested echelons obtaining intelligence in real time remains urgent. A few years back, creation of reconnaissance-strike complexes was considered to be one of the ways of solving it. Certain programs for developing them both in our country and in the United States were curtailed in connection with cardinal changes in the military-political situation in Europe. But upgrading reconnaissance components of the reconnaissance-strike complexes nevertheless is deemed advisable.

We will emphasize that success of the combat functioning of such a complex depends above all on how precisely coordination has been adjusted among units and subunits of different branches of the Armed Forces participating in battle. Unfortunately, in the course of joint exercises this question specifically becomes a Gordian knot for many air and combined-arms commanders to whom the mission of maintaining such coordination is assigned. How to cut this knot is the subject of a separate conversation.

Specialists of leading world armies single out aerospace reconnaissance among many information sources. The West is developing a unified European reconnaissance system, which includes space, air (including drones) and ground assets as well as intelligence collection and processing centers. This already is work for the future, with consideration of the experience of local wars and

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conflicts of recent years. Thus, ocean and continental expanses did not impede the multinational forces in conducting the Persian Gulf operation. The allied success showed that the use of aerial reconnaissance assets is effective for covering potentially dangerous axes devoid of the constant presence of groupings of ground troops (and this specifically is characteristic of Russia, by the way).

Meanwhile, in our opinion the extent to which the Russian Air Force is provided with such assets is far from complete. Add to this the significant reduction in numerical strength of reconnaissance aviation, difficulties connected with redeployment of its most combat-ready units from countries of the near and far abroad to unprepared airfields, and insufficient material-technical supply... In short, like all our military aviation, aerial reconnaissance is experiencing serious difficulties, which are exacerbated by the fact that reconnaissance aviation equipment does not fully meet today's realities. For example, the Air Force reconnaissance aircraft fleet was created with consideration of their employment in a future large-scale war. Therefore in Afghanistan aerial reconnaissance even of targets of insignificant size and importance was conducted by costly MiG-21R, Su-17MZR and Yak-28R aircraft. Of course, a reconnaissance aircraft based on a medium or light attack aircraft would have been more suited for performing such a mission, especially with strong opposition from enemy shoulder-fired SAM systems and light AAA, but the question of creating it has not been resolved up to now.

By the way, it is planned to develop a reconnaissance aircraft for Air Force front aviation based on a new fighter-bomber, in whose creation large amounts of money already have been invested. But is it justified to place reliance on this aircraft alone? The fact is, its use in local conflicts and peacemaking actions is disadvantageous both from an economical as well as a military standpoint, inasmuch as from the very beginning it was intended for operations in a full-scale war and chiefly in the operational depth. In the tactical depth, however, saturated to the maximum by unit air defense assets, it is more advisable to conduct aerial reconnaissance (above all in support of the Air Force) by other less costly means, particularly reconnaissance drones. But it is not all that simple. Let us recall that simultaneously with the transfer of Army aviation from the Air Force to the Ground Troops, essentially the entire fleet of drones also received a new "registration." Missions which front aviation must perform in the tactical depth did not become fewer, and so a need remains for constant aerial reconnaissance there. Does the Air Force have enough of its own forces for this now?

And not everything is all right with aerial reconnaissance in Air Force Long-Range Aviation. It is problematical to expect that new types of aircraft will become operational in the next few years due to economic difficulties. Nevertheless, there is an urgent need for producing long-range reconnaissance aircraft, caused, for example, by the need to monitor the situation in neutral waters surrounding Russian Federation territory. This is even

more urgent because some western countries are not letting up in work of creating aerospace combat aircraft, including in a reconnaissance version. For example, U.S. Project Aurora envisages the development of a reconnaissance aircraft capable of flying at an altitude around 30 km and at a speed corresponding to Mach 8.

Today the accomplishment of such a unique, costly project is accessible only to a few countries. And tomorrow? We will not forget that for a long time the USSR and United States were the main manufacturers of missile equipment, but already now a number of states are putting their own spacecraft into outer space. The production of hypersonic combat aircraft as relatively inexpensive substitutes for space combat systems also will become fully realistic in the not-too-distant future. Does Russia need them? Now it is difficult to answer unequivocally. It would appear that work in this direction must be continued even under the present difficult conditions, considering the substantial amount of work done in advance in this area. Moreover, a hypersonic aircraft also capable of flying in a near-Earth orbit can be used successfully not only for reconnaissance, but also for delivering bombing strikes and intercepting airborne targets.

In our view, one other problem of no small importance also has appeared. It is the formation of a new approach to peacetime monitoring of the situation on the Russian state border. More effective technical equipment capable of monitoring vast expanses not equipped with systems of manmade obstacles already is required today for border security and defense, such as a reconnaissance aircraft (a modified small transport aircraft) equipped with gear for detecting airborne and ground targets day or night in all weather conditions. What is important in the given case is its capability not so much of penetrating the air defense system as of conducting lengthy, active operations.

By the way, such an all-weather reconnaissance-patrol aircraft already is being developed jointly by the United States and Great Britain under the MSSA (Multi Sensor Surveillance Aircraft) program. Its onboard reconnaissance equipment complex includes the AN/APG-66 radar previously installed in F-16 fighters; television, infrared and laser search systems; and gear for transmitting intelligence to the ground in real time. Obviously, expenditures for operating such an aircraft will be an order of magnitude below the costs connected with supporting the functioning of operational-tactical and especially strategic combat reconnaissance complexes. And this is an additional argument in favor of creating such an aircraft here.

It stands to reason that our analysis of the present status and prospects for development of aerial reconnaissance does not take in all problems, and other ways of solving them can be suggested. We would like to learn what interested persons and specialists think on this score. An exchange of opinions would contribute to the development of such an important sphere of military science and practice.

Commentary by Lieutenant General of Aviation Nikolay Rastorguyev, chief of Air Force Intelligence Directorate

There are more than enough arguments in favor of aerial reconnaissance as a priority kind of combat support of the Air Force. Some are cited in the above article. I would note also the increased role of information in general, especially in the military sphere. Yes, we are not planning to attack anyone; this is the pivot of Russian military doctrine. But we must be absolutely certain that we ourselves will not become the target of aggression at a certain point. What can give such certainty? It is largely an effective system of reconnaissance as a whole and aerial reconnaissance in particular. This is if we look at the world realistically and not through rose-colored glasses.

For example, how great the importance of the reconnaissance component is in the creation and functioning of precision weapon systems! What is the use, for example, of having a missile with an accuracy down to several meters if information on the target is provided with an accuracy to several hundred meters? The precision of intelligence must be comparable with capabilities of the strike complex.

With respect to aerial reconnaissance, it uses the most modern means of data collection—optical, infrared, laser, television and radar—and information collected with their help can be transmitted to interested echelons in near-real time.

It is impossible to disagree with the article's authors that aerial reconnaissance must have all necessary forces and assets for effective performance of tactical, operational and strategic missions. In analyzing the state of affairs in reconnaissance aviation from this standpoint, they draw the conclusion that not all is well here. In particular, in their opinion there are not enough inexpensive, economical aircraft and drones intended for conducting reconnaissance in the tactical depth.

Well, there is a problem, but it is being solved, including through the development of corresponding aircraft and technical equipment. The Air Force command sees an insistent need for preserving and increasing the potential of aerial reconnaissance and gives us constant assistance, such as in training specialists for servicing technical reconnaissance equipment. The only educational institution where they were being trained after disintegration of the Union remained in Ukraine. It was necessary to create a new training facility in compressed time periods, and today such specialists already are being trained in Russia.

I can say the following concerning the development and acceptance of advanced reconnaissance aircraft (long-range, aerospace, hypersonic and so on) into the inventory. The resolution of such questions depends basically on the state's economic might and capacities of its military-industrial complex. My own viewpoint is as follows: reconnaissance, including aerial reconnaissance,

is not a budget item on which it makes sense to economize. Otherwise a situation where incommensurably greater costs cannot be avoided is fully probable, according to the simple logic that the miser pays twice.

Military Transport in the Far North: Prospects Cause No Joy

95UM0166D Moscow ARMEYSKIY SBORNIK
in Russian No 5, Nov 94 (signed to press
28 Oct 94) pp 18-21

[Article by Captain-Lieutenant Oleg Izotov, deputy military commandant of Arkhangelsk sea and river port water area]

[FBIS Translated Text] If five years ago someone had said that, blushing deeply, I would have to try to find words to answer "as delicately as possible" the question: "Just when will the Ministry of Defense repay its debts?" I probably would have taken this as not a very appropriate joke.

As a matter of fact I am a state person. I wear a military uniform and the insignia of the Russian Armed Forces and I have the homeland behind my back. And if I have come somewhere to sign a transport movement plan on behalf of and in the interests of the state, this means I have to be sure it is supported from the first to the last line with all kinds of monetary appropriations. But different times have arrived...

Planning is the starting point of troop life and activity. With respect to delivery of cargoes, it is the military transport movement plan. It is drawn up by VOSO [military transport] agencies and shipowners based on requisitions of military transport services of the Leningrad Military District and Northern Fleet. Seemingly everything should be in order. Nevertheless, in the course of the navigation season, commanders of units located in the given basin submit more and more new information updating the volumes for delivery and removal of cargoes. It already has become the habit for VOSO officers to recheck the presence of cargoes, postpone transport movement time periods due to their nonarrival in port and make corrections to the transport movement plan while under way, based on telephone messages of the cargo owners.

By defending the real interests of cargo owners, such measures make the planning arrangement more flexible, but the arrangement for fund allocation adopted within the Russian Federation Ministry of Defense structure has remained the same. In my view, it was necessary to revise it long ago. For the time being, only those requisitions submitted to supply agencies are supported by finances, although, with the constant state budget deficit, even these officially registered and approved transport movements are not completely and promptly supported.

The remoteness of military units creates many difficulties. For example, it takes weeks for payments to get

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from Murmansk to Arkhangelsk. During the past navigation season shipowners warned cargo owners about a suspension of transport movements in case of nonpayment of debts and about additional penalties. The Leningrad Military District alone paid R55 million to the Northern Shipping Company because of this.

Meanwhile, shipowners also have more than enough of their own problems. The number of Northern Shipping Company vessels is dwindling before our eyes: since 1988, 77 have been written off and only 28 have been delivered. Timber ships built with consideration of Ministry of Defense requirements no longer meet requirements of the Russian Federation Register of Shipping. More and more, the new vessels coming into our basin are commercial, with small displacement and with cranes with not over 5 tonnes of hoisting capacity. Tell me, what is the sense of sending such "little weaklings" to our points? Alas, today the shipping company operating in the White, Barents and Kara seas has no general-purpose supply vessels capable of transporting the full nomenclature of cargoes at once and to the full extent.

The production cost of maintaining vessels continues to grow. According to the forecast for the current year, it will be from 3 to 9 million rubles per day for one vessel, and this is not counting the 35 percent of accruals and 20 percent value-added tax! It is of course possible to transport cargoes by vessel more cheaply, but there are not many of them, and cargo equipment often does not meet our requirements. We are forced to use vessels such as Pioneer Moskvyy for transport movements, but they are needed by everyone everywhere: military clients are not the only ones for the Northern Shipping Company. And it refuses debtors first...

Now about demurrage at harbor points. This is an unavoidable evil with which one has to be reconciled from year to year. Alas, the requirements of maritime transport documents do not take into account hours of darkness and tidal periods, i.e., they ignore a situation in which it is simply impossible to unload. Moreover, even elementary equipment is absent at military posts with which it would be possible to remove cargoes from pontoons. They either drag them using vehicles with cables or carry them by hand, box by box...

The position of the shipowner in this question is unequivocal: Why should the one who provided transportation pay for the consignee's lack of organization? As a result, for example, during the 1993 navigational period the Northern Fleet alone overpaid the Northern Shipping Company around R360 million for a delay of vessels involved in processing at Kola Bay points. But the fact is that vessels are processed dockside at these points.

Work productivity could be increased by using barges with greater cargo-carrying capacity and by using amphibious equipment and air cushion platforms belonging to civilian organizations.

In my view, unloading technology itself should be changed radically to speed up the processing of vessels,

such as by transporting cargoes by air using helicopters. There is experience, and no small amount, in civilian construction and in supplying geological parties. This is especially so as problems of cargo handling at harbor points soon will rest entirely on the shoulders of consignees. But the latter have no money to maintain floating craft... A closed circle?!

In the late 1980's the Ministry of Defense purchased and sent 50-tonne tank pontoons to points where its subunits were stationed. But their use showed that operating harbor craft directly at the consignees' stationing point is technically very complicated and economically inexpedient.

It is unclear for now who will provide the transportation services so necessary to the cargo owner in the future. One thing is without question—shipowners will not allocate floating craft for harbor cargo handling.

The arrangement for delivery of liquid fuel also continues to be imperfect. Only one Partizansk-Class tanker has remained on the balance sheet of the Northern Shipping Company, and she is incapable of supporting the entire delivery in the navigation season. After disintegration of the USSR, the fleet of reinforced, ice-type of tankers remained with foreign shipowners. There must be interworking of VOSO agencies of the country's water basins through the Russian Federation Ministry of Defense Central Directorate of Military Transport. Thanks to such interworking, during the past year's navigation season the Neftudovoz-59, a tanker of the Volgotanker Shipping Company, was used in the North Sea Basin. The tanker not only performed her contractual obligations, but also delivered fuel not accepted for transport movement by the Northern Shipping Company to a number of points.

Unfortunately, not everything is dependent on VOSO officers. Often they can only gesture helplessly when they encounter the directions of commanders "burdened" with powers to decide for others... from afar. These twin decisions are made according to the principle of "just so nothing happens." Thus, in the many years of experience of military transport movements in the North Sea Basin it was customary to dispatch the first vessel for Arctic points in April. With reduced volumes, the costly April "journeys" turned out to be unnecessary from 1991 on. Nevertheless, during the 1992-1993 navigation period National Air Defense Troops Staff representatives rigidly insisted on conducting the "customary" transport movement—through inertia, we assume. And they got what they wanted! Only in the present year's navigation period did the April trip manage to be rejected thanks to efforts of VOSO agencies.

Now more and more transport movements are organized under direct agreements. They are concluded by cost-accounting units and military collectives in whose interests mass transport movements are carried out, which makes it easier for shipowners to work with military clients. The cargo carrier and client assume agreed-upon

obligations for time periods and payments. In addition, Armed Forces cargo owners are concluding contracts with the Arkhangelsk commercial seaport for cargo handling, storage and shipment and for preparation of transport documentation. VOSO agencies take part in drawing up such agreements and monitor observance of Ministry of Defense interests and fulfillment of obligations assumed by the parties.

Here is another sad point connected with transport movements. The Northern Fleet performs some of them (in its own interests) using auxiliary vessels, which arrive in the port of Arkhangelsk under the naval ensign unexpectedly, like "guerrillas," without notification and without submitting requisitions for cargo-handling and supply. And as a rule they stand idle for weeks without work. To keep such a thing from happening it is necessary merely to notify VOSO agencies beforehand.

Any VOSO officer will agree that the commander of a northern post should not be racking his brains over how to deliver everything necessary to his subordinate units for their life and work. VOSO agencies, a large-capacity rear, and supply structures are obligated to resolve these questions within the Ministry of Defense structure. Time periods for submitting requisitions for all kinds of support have been communicated to each commander by directive. It remains only to submit reliable—specifically reliable—information in time about the capabilities and requirements of military collectives.

Of course, it is not easy to work under conditions of a shipping company monopoly. Moreover, military transport movements are not profitable economically, and technically they are burdensome. Therefore we were very pleased when we learned that scientists of the St. Petersburg Central Scientific Research Institute of Maritime Transport received an assignment from the government of Russia to work out a state program for the North's survival. Then we automatically had the thought: If the

North is being studied at a "swoop," then how will the "state program" itself look? In addition, nothing more has been heard of it, and now there are different people in the government. But how necessary, specifically today, is a comprehensively substantiated program with serious scientific calculations and with consideration of the opinion of old-time northerners for supporting the life and activity of Russians in the Far North? Will this "daring" dream come true? What awaits us in the future?

I will admit frankly for now that I, a state person wearing shoulderboards, feel unneeded and forgotten. Is that not why I look uncomfortable at the very least in front of a shipowner whom I am trying to hire in the interests of that same state whose name is Russia?

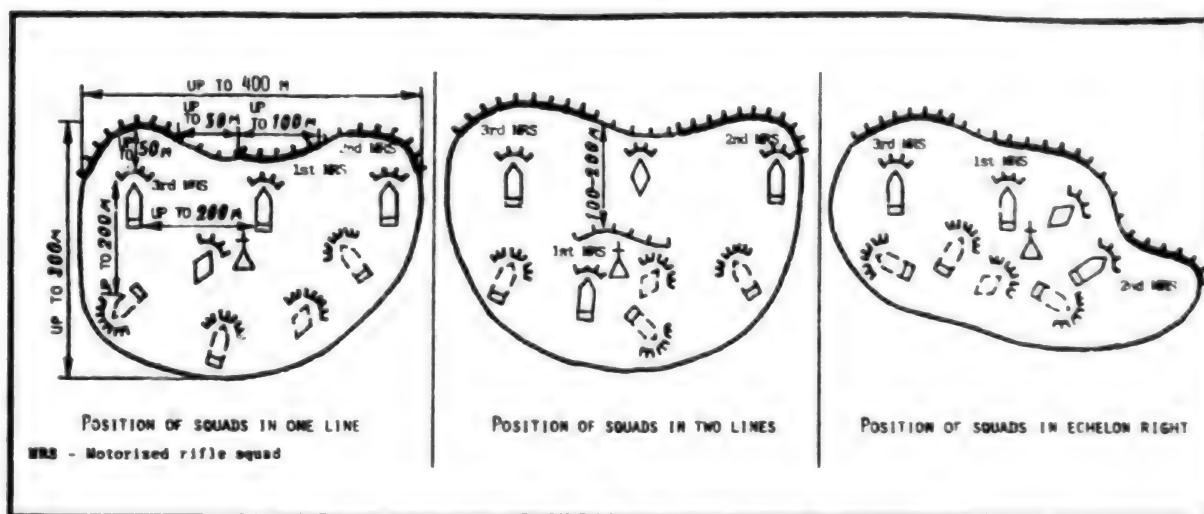
COMBAT TRAINING

Platoon Defense Alignment

95UM0166E Moscow ARMEYSKIY SBORNIK
in Russian No 5, Nov 94 (signed to press
28 Oct 94) pp 22-26

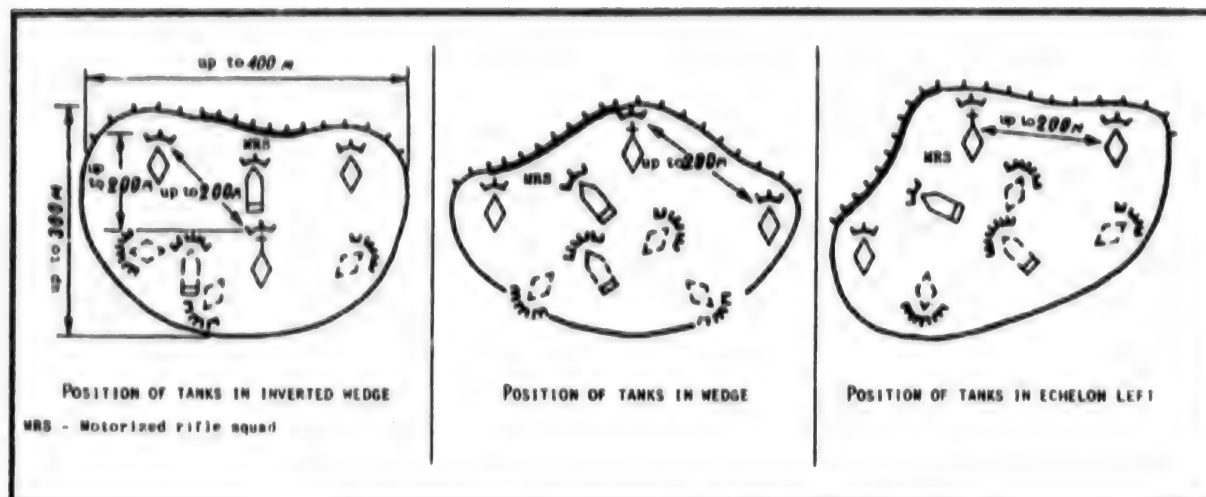
[Continuation by Aleksandr Denisov and Nikolay Shishkin of article begun in VOYENNIY VESTNIK, Nos 1, 2, 4, 5, 1994 and ARMEYSKIY SBORNIK, Nos 1-4, 1994]

[FBIS Translated Text] The platoon defense alignment includes the battle formation, strongpoint and system of fire. The battle formation of the motorized rifle (tank) platoon consists of motorized rifle squads (tanks) and attached subunits. It is aligned depending on assigned missions and terrain conditions. Motorized rifle squads defend positions while disposed as a rule in one trench in a line. The trench connects emplacements of motorized riflemen, BMP's (APC's), tanks and other weapons, and protective shelters.



Battle formation of motorized rifle platoon in the defense (variant)

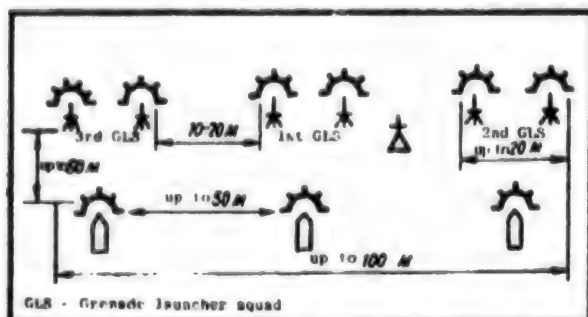
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Battle formation of tank platoon in the defense (variant)

To strengthen the stability of the defense, one squad in a platoon defending on the most probable axis of enemy advance may be disposed in the depth of the strongpoint (at the second line) 100-200 m behind the trench. With the threat of a flank assault, the platoon battle formation is aligned in an echelon right or left, and that of a tank platoon, in addition, in a reverse wedge or wedge. BMP's and tanks are disposed in a strongpoint with intervals up to 200 m laterally and in depth.

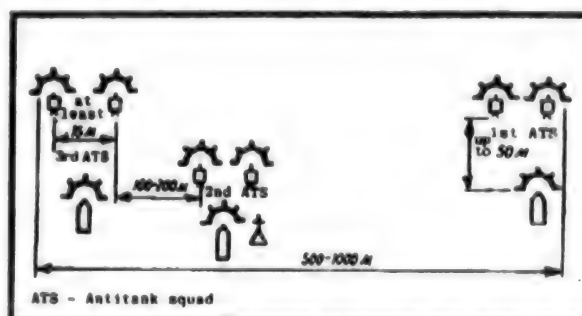
If an antitank squad and flamethrower squad are attached to a motorized rifle platoon, they usually are disposed at motorized rifle squad positions, and a grenade launcher squad is disposed in intervals between them or on one flank of the platoon strongpoint. With the presence of a grenade launcher platoon in a motorized rifle battalion, the grenade launcher platoon battle formation consists of squad battle formations. Intervals between them are 10-20 m. Overall platoon frontage does not exceed 100 m.



Battle formation of grenade launcher platoon in the defense (variant)

The battle formation of an antitank platoon, depending on its organization, is the line of deployment of heavy

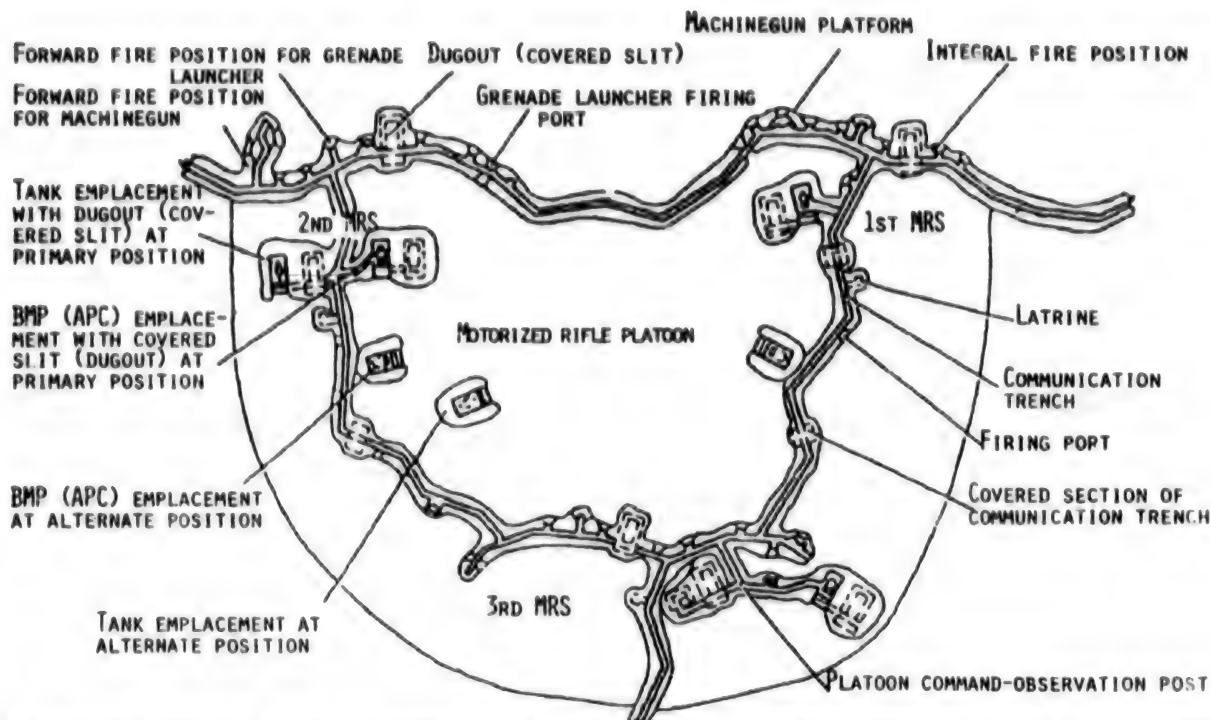
antitank grenade launchers and antitank guided missile [ATGM] system squads (or just of antitank missile system squads). Lateral intervals between squads and the distance in depth can be 100-200 m. Platoon frontage sometimes reaches 500-1,000 m. A linear disposition of weapons is impermissible. They are disposed in an echelon left or right, a reverse wedge or a wedge.



Battle formation of antitank platoon in the defense (variant)

The battle formation of a grenade launcher squad consists of two teams and the BMP (APC), situated in the depth at a distance of up to 50 m from the teams. With an antitank squad present in a motorized rifle company, the battle formation is aligned from ATGM teams deployed laterally, with intervals of at least 15 m between launchers, and from the APC.

The motorized rifle platoon strongpoint consists of squad positions and the firing positions of BMP's (APC's) and attached weapons, and the tank platoon strongpoint consists of firing positions of tanks and attached weapons. Squad positions most often are sections (extending up to 100 m) of a continuous trench dug



Fortification of company first echelon motorized rifle platoon strongpoint (variant): preparation requires 1,100 man-hours and 7 machine-hours for a tank with bulldozer blade. Materials: round timber—45 m³, wire—135 kg. An additional 350 man-hours are required for revetting 30 percent of emplacements and communication trenches. Materials: round timber—20 m³, wire—120 kg

along the entire frontage of the platoon strongpoint. Weapons of motorized rifle squads and sometimes also the senior commander's weapons are deployed in them. The BMP is considered the basis of the defense. Riflemen, machinegunners and grenade launcher operators are disposed in such a way that all approaches ahead of the frontage and on the flanks are under effective fire (especially flanking and cross fire) and that obstacles and barriers are clearly viewed and covered by fire. The squad frontage can be up to 100 m and intervals between squads up to 50 m.

Firing positions¹ of BMP's and tanks are selected both on forward as well as reverse hillslopes with consideration of terrain relief and so as to ensure observation of the enemy and conduct of direct fire to maximum range from guns, machineguns and ATGM's. Concealment of the disposition, maskirovka [lit. "camouflage", however, includes "concealment" and "deception"—FBIS], mutual fire support of adjacent vehicles, the opportunity of conducting concentrated fire ahead of the FEBA and on the flanks, and conduct of a perimeter defense also are mandatory.

APC firing positions usually are placed in the depth of the strongpoint with consideration of the possibility of conducting fire primarily toward flanks and gaps, and firing positions of the antitank squad and flamethrowers

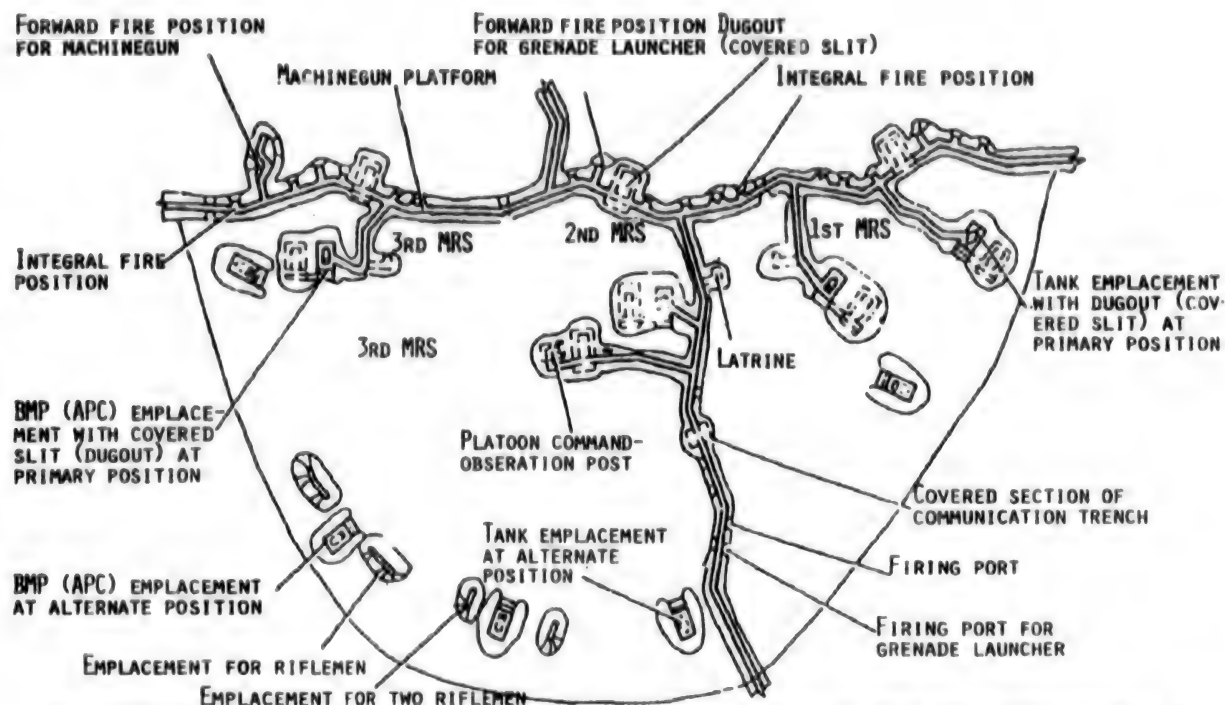
attached to the platoon are accommodated at motorized rifle squad locations. Antitank weapons and tanks not subordinate to the platoon commander may defend in the platoon strongpoint and on its flanks. Firing positions of the grenade launcher platoon are designated in intervals between strongpoints of motorized rifle companies (platoons) or on their flanks. The antitank platoon is accommodated in strongpoints of motorized rifle companies or in intervals between them on likely avenues of tank approach.

Tanks, BMP's, grenade launchers and machineguns are the basis of the platoon system of fire.² It must ensure engagement of the enemy, above all his tanks and other armored vehicles, on approaches to the defense, ahead of the FEBA, between adjacent strongpoints and in the depth; the possibility of conducting effective frontal, flanking and cross fire; and also perimeter defense of the strongpoint.

Concentrated fire is the fire of BMP's (APC's), tanks, grenade launchers and small arms against one target or part of the enemy battle formation on his probable movement paths. It is conducted by the platoon and the squad, prepared in advance, and commenced suddenly.

The range of fire concentration of a BMP(BMP-2)-equipped motorized rifle platoon is 2,000-2,500 m

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Fortification of company second echelon motorized rifle platoon strongpoint (variant): preparation requires 1,250 man-hours and 7 machine-hours for a tank with bulldozer blade. Materials: round timber—45 m³, wire—135 kg. An additional 350 man-hours are required for revetting 30 percent of emplacements and communication trenches. Materials: round timber—20 m³, wire—120 kg

(fire is conducted with fragmentation-high explosive and fragmentation-tracer projectiles). That of the tank platoon is 3,200-3,600 m (fire is conducted with the authorized artillery round). That of the grenade launcher platoon and squad (AGS-17) is 1,500-2,000 m and 800-1,500 m respectively (fire is conducted with authorized rounds). The range of concentrated small arms fire is up to 600 m from assault rifles and light machineguns, up to 1,000 m from PK and PKT machineguns, and up to 2,000 m from heavy-caliber machineguns on APC's.

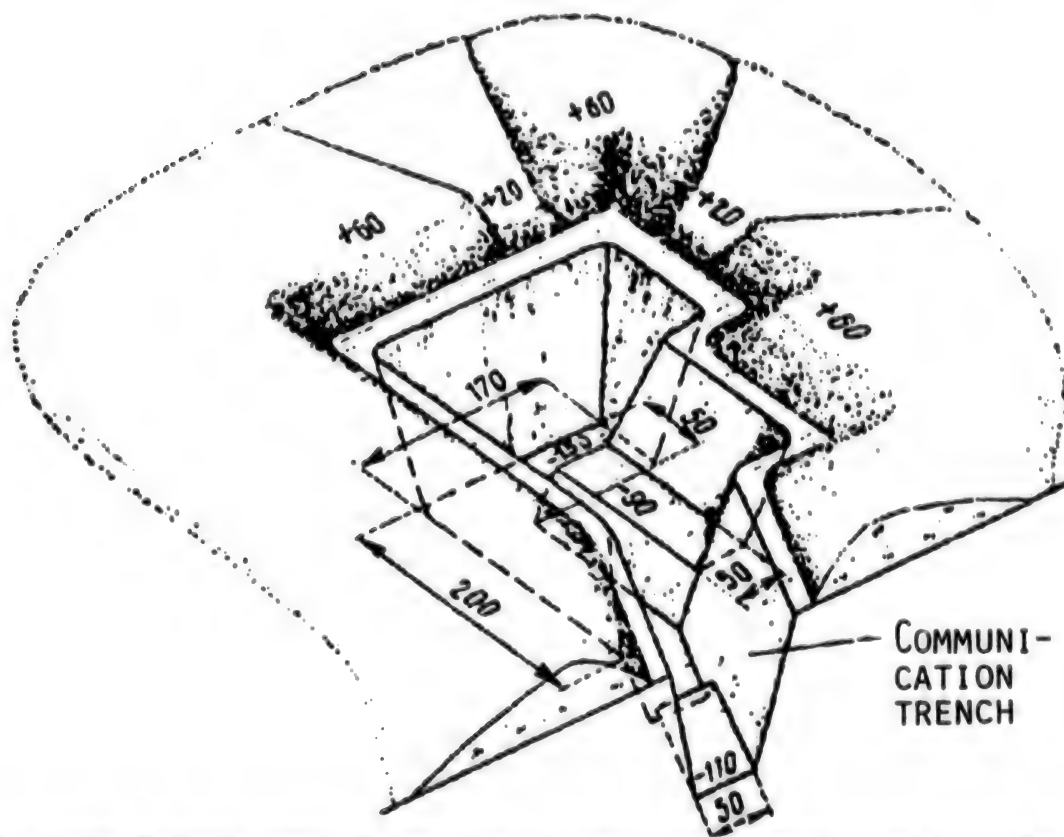
The size of a fire concentration sector for the tank platoon is 120 m (40 m per tank) in frontage and up to 100 m in depth; for the BMP-equipped motorized rifle platoon it is up to 75 m (25 m per BMP) in frontage and up to 50 m in depth; for the grenade launcher platoon and squad it is 100 m in frontage and 50 m in depth (3rd and 1st exercises in platoon and squad firing of automatic grenade launchers). For motorized rifle platoon small arms the fire concentration sector with a density of 10-12 bullets per meter can be 150-200 m, and for the motorized rifle squad 50-70 m. These dimensions are dictated by the following. Four assault rifles and two machineguns capable of firing up to 700 rounds (4x100+2x150) usually are used for conducting concentrated fire in the squad, and platoon weapons are capable of over 2,000 rounds per minute. Dividing the number of rounds by necessary bullet density, we obtain the

width of the fire concentration sector for the squad as 60-70 m and for the platoon as 170-200 m.

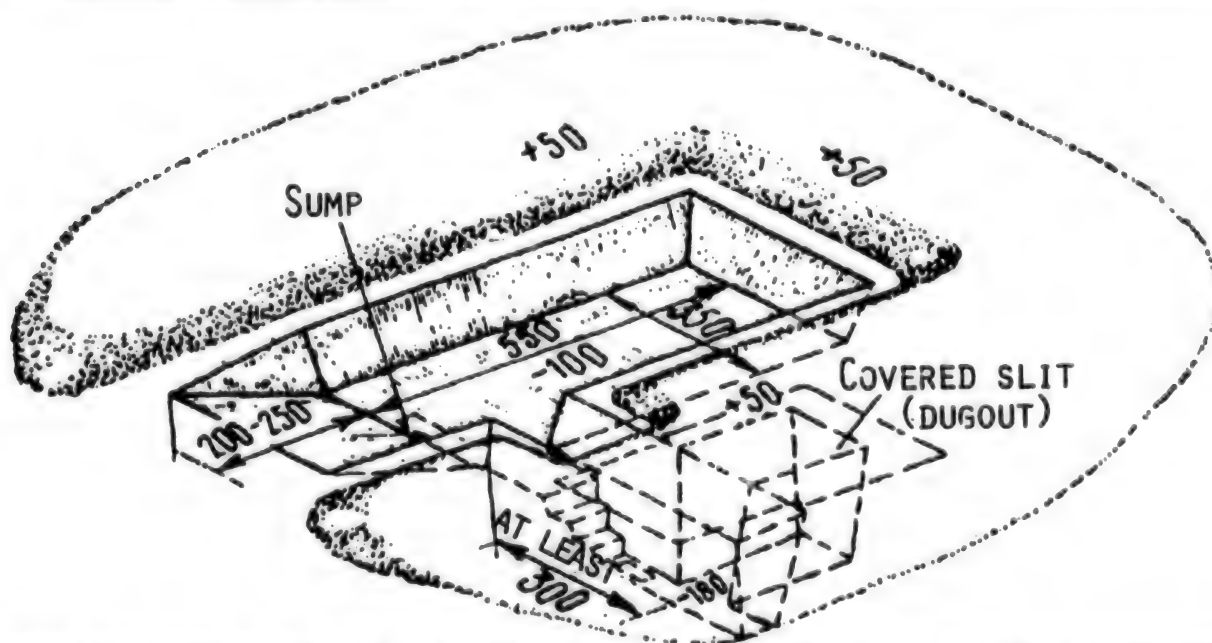
The zone of platoon antitank fire is the terrain sector ahead of its FEBA against which fire is prepared in advance and conducted from BMP's, tanks and other antitank weapons. The zone has two boundaries in depth: near and far. The near boundary is determined by the FEBA and the far boundary by maximum range of aimed fire of antitank weapons available in the platoon. Thus, for a motorized rifle platoon the depth of the zone is determined by the ATGM launch range, around 4,000 m, and for the tank platoon by the grazing-fire range of tank guns, 2-2.5 km. Commence-fire lines for different antitank weapons are designated within limits of the zone. BMP's, tanks and shoulder-fired antitank grenade launchers commence fire when the enemy arrives at them.

A zone of massed, continuous, multitiered fire is established for repelling a massed assault by tanks and infantry. It is a terrain sector against which the platoon prepares massed, continuous, multitiered fire in advance or in the course of battle and conducts it from all available weapons ahead of the FEBA, on the flanks, in intervals with adjacent subunits and in the depth of the strongpoint. It also has near and far boundaries. The near boundary is determined by the FEBA and the far boundary by the range of effective small arms fire (around 400 m).

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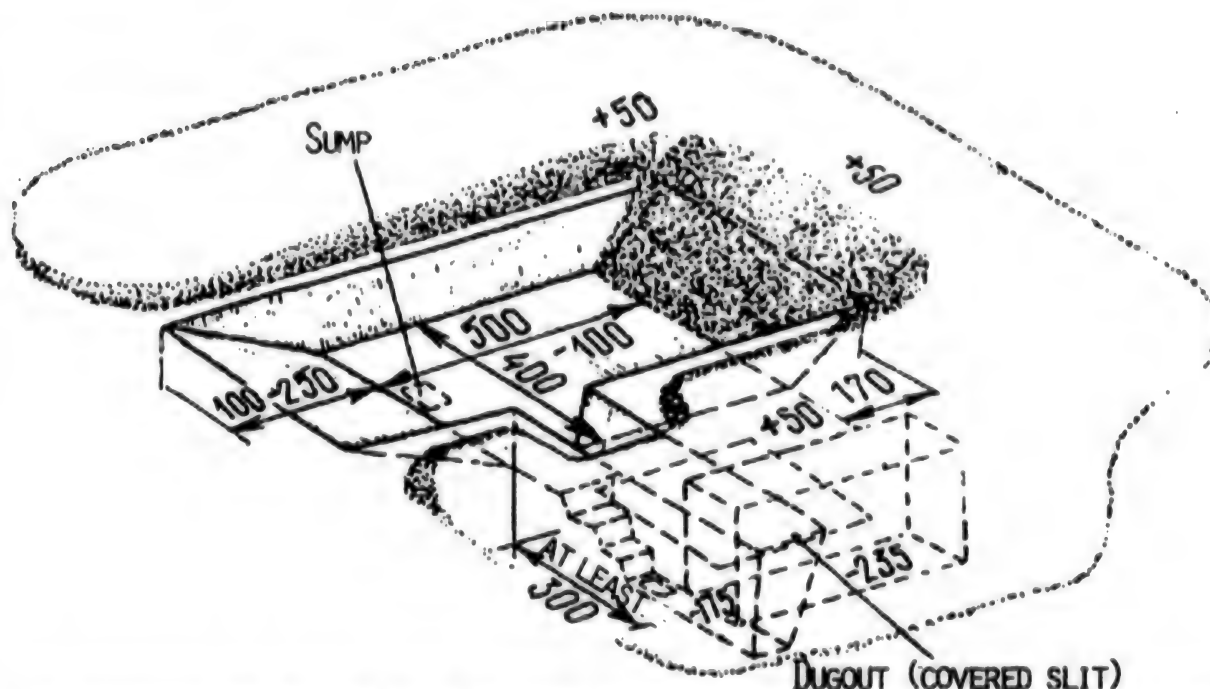


Open structure for platoon commander's observation: making structure using entrenching shovel requires 5 man-hours



BMP emplacement with all-around field of fire: If necessary to conduct fire from vehicle firing ports, the breastwork in the sector of fire must be +40 cm. Making the emplacement requires 32 man-hours; using the PZM-2 earth-moving vehicle requires 0.3 machine-hours and 8 man-hours less slit trench (dugout)

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Tank emplacement with all-around field of fire: making the emplacement (less dugout) with the help of a tank with a bulldozer blade requires 0.6 machine-hours and 5 man-hours

Fire is organized in the platoon ahead of the FEBA and on the flanks in such a way as to ensure fire coordination among weapons and strongpoints. It should reach maximum intensity and density on axes of likely enemy advance. All weapons must be ready for broad maneuver and for conducting fire at night and under other conditions of limited visibility. Readiness of the system of fire is determined by occupation of the indicated positions by BMP's (APC's), tanks, guns and other weapons, by the preparation of firing data, and by the availability of ammunition.

Footnotes

1. A firing position is a place occupied or planned for occupation by a BMP (APC), tank or other weapon. Proper selection of positions is a very important condition for successful employment of weapons in defensive battle. They are subdivided by purpose into primary, alternate, temporary and dummy positions.

Primary firing positions serve for performing assigned missions in the course of battle. Temporary firing positions are occupied by alert-status weapons, BMP's, APC's and tanks for performing individual missions and misleading the enemy regarding the configuration of the system of fire. Alternate positions are intended for executing a maneuver (in case it is impossible to perform the mission from the primary position), and dummy positions are for concealing the subunit's true position.

2. The platoon system of fire is the skillful positioning and use of platoon weapons for engaging the enemy in accordance with the commander's concept. It is aligned with consideration of fire capabilities of all kinds of platoon weapons and its attached weapons, on the basis of their close interworking, and in combination with artificial and natural obstacles. The platoon system of fire includes platoon fire concentration sectors prepared ahead of the FEBA; zones of antitank fire of BMP's (tanks) and massed, continuous, multitiered fire of all other weapons ahead of the FEBA, in the intervals, on the flanks and in the depth of the defense; and a prepared maneuver of fire of BMP's (tanks) and other weapons to threatened axes with their close interworking and in combination with artificial and natural obstacles.

(To be continued)

Forcing Water Obstacles

95UM0166F Moscow ARMEYSKIY SBORNIK
in Russian No 5, Nov 94 (signed to press
28 Oct 94) pp 27-31

[Article by Colonel Anatoliy Nazarov and Lieutenant Colonel Vladimir Bezgin]

[FBIS Translated Text] The development and improvement of means of warfare and troops' increased maneuver capabilities create favorable conditions for

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conducting an offensive at high rates. But its swiftness continues to depend on many factors, not the least of which is the capability of subunits and units to overcome water obstacles in short periods of time.

During the Great Patriotic War our troops often forced 2-3 medium or 1-2 wide water obstacles in one front or army offensive operation. First echelon formations would cross 1-2 narrow water obstacles almost daily. Troop operations basically depended on conditions for crossing the channel and the flow of water; condition of banks, riverbed soils, adjoining terrain, and natural and artificial obstacles; effect of meteorological conditions on the hydrologic regime; and presence of water engineering structures and possible changes as a result of their destruction or use by the enemy.

The conditions for crossing the channel and flow of water are determined first and foremost by width, depth and current velocity. The width of a water obstacle affects the duration of the trip by self-propelled assault crossing equipment and also affects coordination, command and control, the conduct of direct fire and the choice of crossing methods. The requirement for crossing equipment and the expenditure of bridging equipment grows with an increase in width. Therefore bridging equipment as a rule is used for launching bridges on narrow and medium water obstacles and for preparing ferry crossings on wide water obstacles.

Possibilities of using crossing equipment and choice of bridge construction depend on the depth of the water obstacle. Thus, river depth cannot exceed 3.5 m for heavy mechanized bridges. Trestle bridges are built on a depth of no more than 4 m. The water's depth for

opening out PMP [bridging equipment] sections must be at least 0.4-0.5 m, and on the bridge line it must be 0.6-0.7 m.

Water obstacles up to 1.35 m in depth are forded by essentially all types of equipment, but a depth of around 1.5 m hampers use of self-propelled water crossing equipment (including BMP's, BTR's, and MTLB's [multipurpose tracked vehicles]), since the running gear's contact with the bottom increases resistance to movement and in some cases also leads to turning the vehicle. Tanks can cross rivers along the bottom to 5 m in depth with accessible banks and relatively firm bottom, which under present conditions is considered a very important component for achieving success in the offensive.

Current velocity (see Table 1) determines the possibility of preparing and using crossings of a particular kind. It also affects the duration of the trip by crossing equipment and the drift coefficient (K_d), which is established experimentally. K_d has its own value for different amphibious equipment (see Table 2) depending on current velocity and on specifications and performance characteristics of vehicles.

Table 1 - Conditional Classification of Water Obstacles Based on Current Velocity

Current	Current Velocity, m/sec	
	Flatland water obstacles	Mountain water obstacles
Weak	Up to 0.5	Up to 2
Medium	0.5-1	2-4
Swift	1-2	4-6
Very swift	Over 2	Over 6

Table 2 - Drift Coefficient Value for Amphibious Equipment as a Function of Current Velocity

Equipment Designation	Current Velocity, m/sec				
	0.5	1.0	1.5	2.0	2.5
PTS [medium amphibious carrier]	0.98	0.94	0.86	0.73	0.5
GSP [tracked self-propelled ferry]	0.97	0.89	0.73	0.43	-
BTR	0.98	0.93	0.84	0.69	0.43
BMP	0.96	0.85	0.63	-	-
Multipurpose tracked vehicle	0.94	0.75	-	-	-
BMD [airborne combat vehicle]	0.98	0.92	0.81	0.64	0.32

These tables permit concluding that a weak or medium current has no appreciable effect on crossing time and can be disregarded in calculating K_d . But duration of the crossing already increases sharply with a current velocity of 1.5-2 m/sec, and considering the drift coefficient in calculations becomes mandatory. By using the table it is also possible to determine the current velocity at which crossing equipment will be swept away: over 1 m/sec for multipurpose tracked vehicles, 1.5 m/sec for BMP's, 2.0 m/sec for tracked self-propelled ferries, and 2.5 m/sec or more for medium amphibious carriers, BTR's and airborne combat vehicles.

In addition, the current hampers launching bridges from the bridge train set, increases their preparation time, and sometimes fully precludes the crossing of tanks by fording or fully submerged. Thus, fording rivers is not allowed with a current velocity of 4 m/sec or more, and a crossing by tanks fully submerged essentially is impossible at 2 m/sec and higher.

Riverbed soil, floodplain, banks and the condition of entrances and exits are of no small importance. For example, a bed of pebbles or coarse sand is considered suitable for tanks to cross fully submerged. Mud thickness should not exceed 0.7 m here. The capability of

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vehicles to negotiate upgrades and downgrades is reduced considerably on marshy and wet banks. As a rule, the steepness of upgrades negotiated at exits from the water cannot be more than 15 degrees, and the steepness of submerged slopes cannot be more than 8 degrees.

It is desirable to have accessible banks and depths permissible for floatation of vehicles for the entire width of the crossing area in order to ensure a river crossing in battle formations.

Natural and artificial obstacles which reinforce defensive properties of water obstacles must be taken into account. The former include pits, rapids, ledges, branchings, submerged slopes, and scarping of banks as a result of undermining of soils. Of the artificial obstacles, mined obstacles demand special attention. Mines varying in purpose and design features—moored, floating, bottom and others—usually are used to install them. They are emplaced in the form of mine clusters or mine belts.

Anchored and bottom river mines are emplaced at a depth of 1.5-2 m in the form of single-row or double-row minefields. They are intended for disabling combat and other vehicles crossing a water obstacle afloat or along the bottom, and for damaging assault crossing equipment. Minefields are laid so that each piece of equipment is sure to encounter 1-2 mines in its path during the forcing. Therefore the first wave of attacking troops that crosses may be completely put out of action if appropriate measures are not taken to remove obstacles and clear mines from the crossing site.

In the opinion of foreign specialists, seabed influence mines and mine-bombs also can be used for mining wide water obstacles. In Vietnam the Americans made wide use of Mk 81 and Mk 82 mine-bombs and Mk 36 bombs. It is possible to lay minefields in one, two or more rows at depths to 1.5 m using conventional antitank and antipersonnel mines. Their front boundary as a rule is placed at a depth of 1-1.5 m. The density of minefields laid in the water can be at least 1-1.5 and in the most accessible places 1.5-2.

Fire-water obstacles are incendiary fuels of the napalm type as well as any oil products that are dropped into the water and burn. Oil storage areas, pipelines running across or next to the channel of a water obstacle, oil refineries and tankers are used to create them.

As a result of their use, a fiery zone (continuous or with gaps) forms on the water and displaces downstream. For example, a zone extending for 10 km is capable of substantially hampering or delaying for 1-1.5 hours a forcing on rivers with a current velocity up to 1 m/sec, which will permit defenders to take steps to reinforce the defense in the sector chosen for the forcing.

Enemy use of fire-water obstacles immediately after a forcing begins is considered the most dangerous. In this case considerable equipment and personnel losses are

possible, and the threat of isolation of troops who have crossed to the opposite bank also arises. On routes convenient for forcing and for tanks to cross along the bottom, the enemy may emplace knife rests, post obstacles, and tetrahedrons in the water, dump in damaged equipment and, if time is available, scarp the banks. In addition, there is a high probability of wide use of various water engineering structures for controlled reinforcement of the defensive properties of water installations, and of the preparation of locks, dams and canals for destruction.

Similar methods were employed back during World War II. Thus, knowing about an offensive being prepared by the Americans and its time periods, the Germans blew up dams on the Ruhr River on 10 February 1945. Reservoirs were emptied and the water level in the river rose 1.5 m, current velocity grew to 3 m/sec and the flooded zone was from 360 to 1,000 m wide. As a result the Allied offensive operation began a half-month later and was waged 1.5-2 times slower.

In the opinion of NATO military specialists, flooding can be organized in advance or right in the course of combat operations. In the first case flooded areas are created in the depth of the defense in accordance with the defensive operation (battle) plan. In the second case they are used suddenly to disrupt the enemy offensive.

The latter option is especially dangerous, inasmuch as there exists the reality of instantaneous disabling of operating crossings and a change in the nature of the water obstacle. Moreover, the forcing will require additional preparation, involvement of a large amount of reinforcement assets, and a wait for the water level to subside. Meanwhile troops who have managed to cross to the opposite bank will end up separated from the main body and will have to conduct combat operations in isolation for a lengthy time.

Therefore it is necessary to forecast possible scales and consequences of flooding in advance. The disposition of battle formation elements on the terrain first of all must ensure the least likelihood that a considerable portion of subunits will end up in a flooded zone and, secondly, the capability for their rapid removal from the flooded zone. For this, steps should be taken to capture, defend and protect water engineering structures against destruction, especially as under present-day conditions the development of water communication routes, water power, water supply, irrigation and land reclamation led to regulation of run-offs of the majority of reservoirs. They essentially have become controllable obstacles.

Of the meteorological conditions, it is important to take into account first and foremost temperature, precipitation and winds. Rains worsen terrain trafficability and the descent into and exit from the water. Torrential rains falling above the crossing area give rise to intensive floods which increase the width of the water's surface, current velocity, and depth of rivers. Heavy winds increase the drift of amphibious equipment and contribute to the appearance of chopiness and motion,

which create the danger of vehicles sinking. With a wind velocity of 10 m/sec and higher, the entrance into and exit from the water becomes dangerous due to the strong wave battering characteristic of wide water obstacles.

In winter the ice regime, ice thickness and condition, snow depth, low air temperature and so on affect preparation and maintenance of crossings. Ice crossings are prepared for a crossing of troops or, if the ice cover is insufficiently strong, then assault crossings and ferry crossings are prepared as well as the crossing of tanks fully submerged or by fording. When an obstacle is being crossed over the ice, it is necessary to provide for rapid creation of alternate crossings in case the enemy destroys the ice. Breaches up to 3 m in diameter are considered safe. The distance from them to the route axis should be over 20 times the ice thickness. Holes are filled with ice floes to accelerate freezing.

To prepare assault and ferry crossings, lanes up to 15 to 30 m wide respectively are made. The ice initially is destroyed by the explosive or mechanical method, then the water is cleared of the ice. The lane width is at least 40 m (with weak and medium currents) where tanks cross fully submerged. Special attention is given to clearing it of floating ice.

In addition to factors enumerated above, the forcing time is determined by the rate of advance. Let us assume that a tank regiment will need 2-3 hours to seize a bridgehead 4-6 km deep with a rate of advance of 2-3 km/hr. Using simple calculations it can be determined that on a water obstacle up to 100 m wide and with a depth permitting tanks to cross fully submerged or by deepfording, the regiment must receive up to 8 tracked self-propelled ferries and 6-8 medium amphibious carriers for reinforcement. Special attention here should be given to supporting the forward movement of tanks. Their crossing along the bottom will permit bringing the forcing rates close to required rates of advance. It will take a tank battalion more than an hour to cross a water obstacle around 100 m wide on four tracked self-propelled ferries, but it will take 10 minutes along the bottom (by fording or fully submerged). The important thing in this method is to ensure minimum passive (with respect to the enemy) time of operations of forces and assets.

A regiment may need reinforcement of up to a combat engineer company and engineer road construction and repair company for engineer support (not counting means of direct support to the crossing). It is necessary to conduct engineer reconnaissance of crossing sites and clear obstacles from approach routes and banks in an area of up to 15 hectares and prepare up to 30 km of routes, up to 10-15 descents to the water and just as many exits depending on the nature of banks, up to 20 covered slit trenches and 2-4 dug-in emplacements.

To reduce the effect of water obstacles on rates of advance, it is important on the whole to outfit troops to the maximum extent with equipment capable of negotiating them. Creation of amphibious vehicles as general-purpose

transport will considerably reduce the extent of measures to prepare a forcing and will permit crossing water obstacles at a rate corresponding to the rate of advance.

A special vehicle capable of moving autonomously beneath the water is needed for conducting engineer reconnaissance. Tank and motorized rifle subunits need mineclearing attachments allowing passages to be made in minefields used by the enemy on water obstacles. Back in peacetime it is useful for commanders and staffs to study characteristics of water obstacles based on specially developed descriptions. A knowledge and consideration of the character and features of water obstacles will permit considerably reducing their effect on operations of advancing troops and will ensure successful performance of combat missions.

And Tanks 'Come Alive'

95UM0166G Moscow ARMEYSKIY SBORNIK
in Russian No 5, Nov 94 (signed to press
28 Oct 94) pp 34-35

[Article by Colonel Anatoliy Petrov, candidate of military sciences]

[FBIS Translated Text] Tank units and subunits will be able to conduct combat operations successfully only with comprehensively organized armored vehicle logistic and training support. And it is impossible to get by here without communications.

But combat training practice of previous years shows that secondary significance often was attached to armored vehicle logistic and training support communications. As a result, it was necessary to spend a great deal of time and effort in exercises to have stable, reliable command and control over all armored vehicle logistic and training support elements. This is not that simple to do. For prompt resolution of questions of armored vehicle logistic and training support for the period of performance of combat training missions, such as in the tank regiment and battalion, it is advisable to create a technical support communications subsystem which would be included as a component part in the tactical command and control echelon communications system. Its primary elements are communications centers of the tank regiment rear services command and control facility and tank battalion command-observation post, at which command and staff vehicles, portable radios and telephone exchanges are deployed.

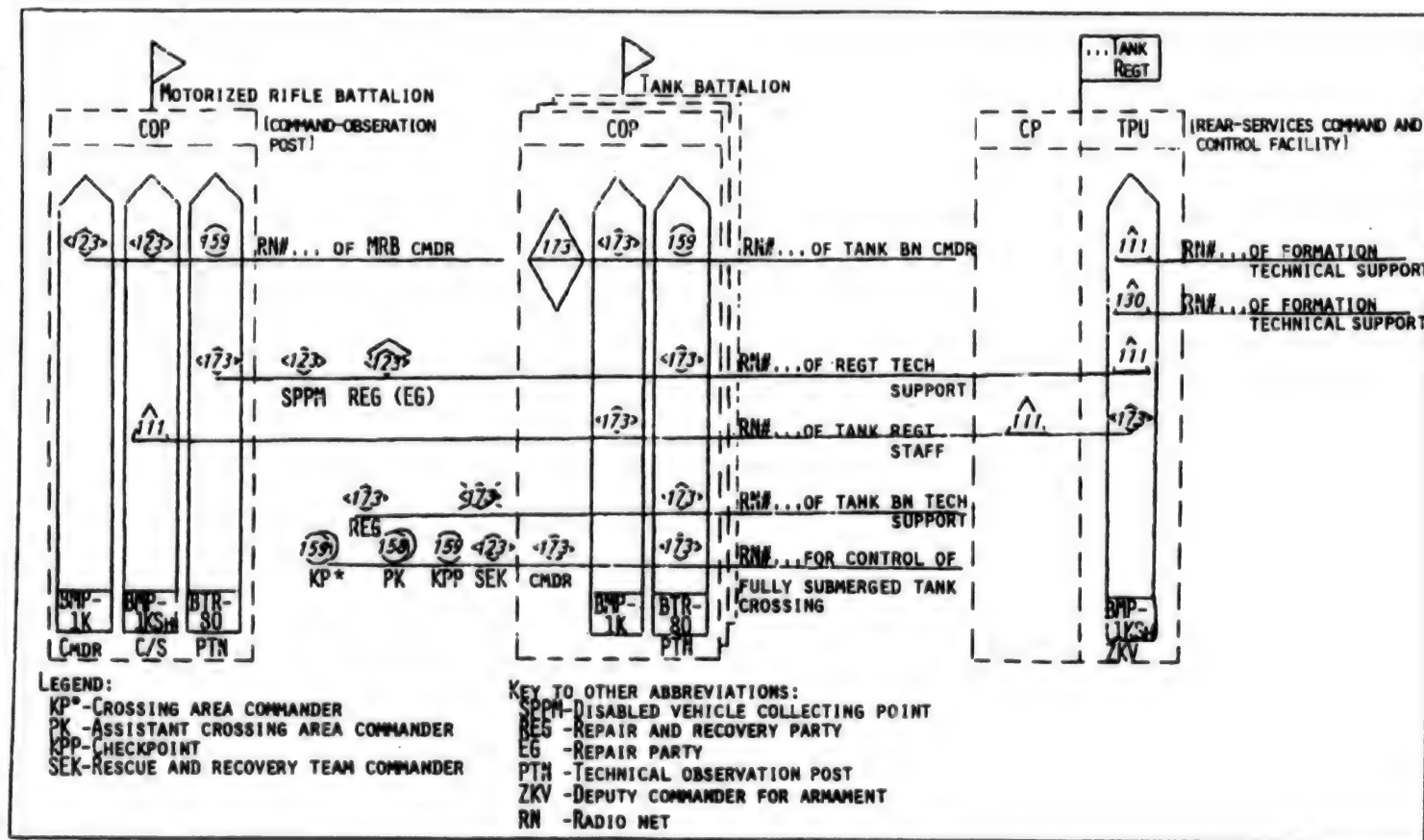
As an example, let us examine the organization of armored vehicle logistic and training support communications during a two-stage, one-sided regimental command and staff exercise on the terrain with students of one of the courses of the Military Academy of Armored Troops. Several combat training tanks and technical support vehicles were assigned to demonstrate the work of armored vehicle logistic and training support entities.

Life convinces us that it is most difficult to provide radio communications here. Therefore let us examine how best to plan it (see diagram).

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Regimental armored vehicle logistic and training support radio communications (variant)



A BMP-1KSh command and staff vehicle was assigned to the deputy regimental commander for armament for the time of the exercise. He maintained communications from this command and staff vehicle with the senior officer of the service over VHF/UHF [UKV] and HF radio nets. The first net was the primary net. Work on the second net commenced only when the enemy suppressed communications over the VHF/UHF net.

The deputy regimental commander for armament communicated with deputy battalion commanders for armament, with the disabled vehicle collecting point, with the repair and recovery party, with repair parties, and also with vehicles damaged in battle over the tank regiment technical support VHF/UHF radio net.

When conducting combat operations on the defense, deputy battalion commanders for armament located at technical observation posts switched their R-173 radios into the tank regiment technical support radio net and R-159 radios into the subunit commanders' radio net. They would gather information about damaged combat vehicles over the latter net.

When the technical observation post displaced, its specialists would clarify the nature of damages to armored vehicles through radio conversations and take steps for recovering them to the regimental disabled vehicle collecting point.

A technical support VHF/UHF radio net was organized in each tank battalion for communicating with battalion repair and recovery parties and with damaged armored vehicles. An R-173 pretuned to the appropriate frequency would be switched into it if necessary.

After reporting damage to their subunit commander and receiving authorization to switch to the technical support radio net, tank commanders would retune radios and subsequently act based on commands from the battalion technical observation post. In particular, they would contact the repair and recovery party chief, meet the repair or recovery party, and tow the vehicle to shelter or to the disabled vehicle collecting point by joint efforts.

Radio communications was provided with the regimental CP by switching the R-173 installed in the BMP-1KSh command and staff vehicle into the tank regiment staff radio net.

In the course of the command and staff exercise, tank subunits had to "overcome" water obstacles by deep-fording and fully submerged under their own power. In this case, on receiving the mission, battalion repair and recovery parties would arrive at the near bank by the beginning of a subunit's crossing and dispose themselves on the terrain in readiness for immediate towing of armored vehicles which stopped in or under the water.

With the beginning of the crossing, the chief of the rescue and recovery team together with a radio operator and diver would observe each tank's movement and the

water's surface at the crossing. The radiotelephone operator worked on the radio net controlling the fully submerged crossing of tanks. He would listen to all commands of the commander of the subunit that was crossing. If a tank stopped beneath the water, he reported this immediately to the chief of the rescue and recovery team, who would determine the cause and if necessary summon a rigging squad by radio and organize the recovery.

Radio nets of crossing area commanders and radio nets for control of the fully submerged crossing (or fording) of tanks were provided when water obstacles were forced by tanks. Deputy battalion commanders for armament would switch radios into the latter radio net and follow the situation if they were in the armor inspection and deepfording operation area. Here it was also possible to maintain communications with battalion commanders, crossing area commanders and their assistants, and checkpoint chiefs.

With respect to wire communications in support of armored vehicle logistic and training support, it was used in assembly areas and in the staging area and when conducting defensive battle. As a rule, it would be accomplished by parallel connection of a telephone to one of the cable lines running through or near the disposition area of the regimental disabled vehicle collecting point.

As the command and staff exercise showed, command and control over repair and recovery assets and over all armored vehicle logistic and training support according to the scheme described above facilitated to no small extent the regiment's successful performance of assigned missions.

A Sociologist's View

95UM0166H Moscow ARMEYSKIY SBORNIK
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[Article by Lieutenant Colonel Sergey Burda]

[FBIS Translated Text] *The editors continue to receive responses to the article entitled "Planned Costs" by Lieutenant General Yu. Proshin, chief of Volga Military District Combat Training Directorate, published in ARMEYSKIY SBORNIK, No 1. A study group of the sociology chair of the Armed Forces Academy of the Humanities set for itself the task of singling out from among the numerous material-technical and organizational problems of officer combat training its social aspects and ways to improve it.*

After visiting Ground Troops formations and units of six military districts, the sociologists devoted primary attention to studying the dynamics of military-social relationships and indicators of officers' social position in the process of combat training, motives and incentives for improving their professional expertise, and social and

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everyday conditions of officer service. One study participant tells about results of this work.

The first issues of ARMEYSKIY SBORNIK have raised in a timely manner the pressing problem of a qualitative improvement in the content, structure and organization of troop combat training and its important component, officer command training.

Study results show that despite all the difficulties, combat training of officer personnel in the troops is conducted and is a matter of paramount importance. Preference is given to individual forms of training. Primary attention is given to firing organic and individual weapons. Exercises in firing from combat vehicles are conducted by officer teams and crews because of an understrength in privates and NCO's. For example, the Leningrad Military District Combat Training Directorate has developed and is successfully introducing to the troops a methodology for conducting company and battalion command and staff exercises with field firing for officers, and squad and platoon field firings where officers themselves perform in the positions of assault riflemen, grenade launcher operators, drivers and so on. With all the automatic drawbacks, such a practice also is not devoid of certain merits. It permits officers on the one hand to upgrade skills in mastering a subordinate subunit's organic weapons and, on the other hand, to exercise command and control of the subunit in the course of firing, driving, and integrated problems and exercises.

Interruptions in the financing of combat training and in logistic support, the near-critical personnel shortage, the continuing cutback in the officer corps and redeployment of units and formations could not help but affect the quality of combat proficiency of officers themselves. Their level of professional expertise dropped. This is shown by results of the last All-Army Officer Field Proficiency Contest. The percentage of unsatisfactory grades for officers who passed through two stages of selection proved to be very high in its final stage. Results of their combat training and the quality of professional preparedness generate no satisfaction in almost half of officer respondents who received an "outstanding" in command training in the course of the inspection based on results of the 1993/94 winter training period.

The study showed that 36 percent of officers are dissatisfied with frequent disruptions in the conduct of combat training in units and 8 percent of those surveyed are not suited by its content. Over half (53 percent) of the officers believe it does not meet modern requirements in the Ground Troops. All this confirms the need for most rapid introduction of a new command training system to troop practice.

An analysis of questionnaire survey results permitted determining certain directions for improving officer combat training. Twenty-six percent of those surveyed see this to lie in elevating the officer's social status and the public prestige of military service. Up until recently the public understanding of the officer profession was as

a distinctive "social elevator": it was honorable, high-paying, and permitted achieving a certain material and social well-being. The sharp drop in prestige of Armed Forces service connected with the reduction in officer personnel, low income level, unsettled state of everyday life, social lack of protection and so on radically changed the impression of opportunities of the military profession.

Undeserved attacks by the mass media also did no small damage to the public authority of officers. The process of changing spiritual-moral values and reference points in life played its role. Under those conditions officers themselves also are beginning to doubt the benefit of their work to society and the need to increase professional expertise, which of course is not to the good of the service. But if an officer realizes that by serving the people honorably he is defending a homeland which remembers him and rewards worthily for military work, then the psychological mood of a regular military person regarding service and its main component, combat training, also will be higher than today.

Solving the problem of a lack of correspondence of the importance of combat training to the situation actually existing in units and formations will permit increasing the effectiveness of officer combat training. The place of combat training in the structure of officer service is the most important thing for 25 percent of those surveyed and of average importance for 41 percent. But if we take into account that its place is specified as intermediate between average and most important for another 20 percent of respondents, it is clear that combat training holds a rather high place in the system of values of officer service for the majority (45 percent). A certain set of expectations and notions about military service in general and officer service in particular which took shape back in the stage of choosing a profession and training in military school plays its role here.

In his ideas of life, each officer saw the main content of his activity to lie in persistent, daily combat training and an improvement of military proficiency. Many officers who have served in combat units for a considerable time still remember the "cult" of combat training and sleepless nights on the eve of field firings and launches. For example, in answering the question of attitude toward combat training, Colonel N. Skorkin, commander of a Leningrad Military District rocket artillery regiment, recalled with a sense of nostalgia how he and other young lieutenants performing duty as platoon commanders in the Far East would devote free evenings to solving fire missions, mentally figuring elevation corrections and switch of the piece.

The situation has changed in our days. Forty percent of those surveyed link dissatisfaction over the status and quality of combat training above all with the fact that they basically have to work on what has nothing to do with combat training. Thirty-eight percent of those surveyed would like to improve their professional expertise, but do not have that opportunity.

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The other side of the problem is that results of combat training and military proficiency which have been achieved essentially have no effect on an officer's career. Among factors of service-position advancement characteristic of their units, along with job qualities (42 percent) and diligence in work (28 percent) many of those surveyed noted those such as the presence of informal ties (28 percent), good relations with higher-ups (27 percent) and abilities as a "go-getter" (24 percent), and only 14 percent of the officers named results of the subordinate subunit's combat training.

In this connection it is again apropos to recall results of the All-Army Officer Field Proficiency Contest. None of the winners were given a higher position or early promotion based on its results. This indicates that such key factors as "whom you know" and "sponsorship" play a more important role in the system of an officer's service-position advancement compared with the level of an officer's military proficiency and results of the subordinate subunit's combat training.

In the opinion of officers surveyed, an important direction for improving professional expertise is a revision in the set of moral and material incentives for successes in combat training.

Today material and financial incentives come to the foreground in the officer environment. Thus, 64 percent of those surveyed are not suited merely by moral incentives for combat training successes. Only 15 percent of respondents believe that today's officer is guided in day-to-day life by a standard such as zeal and high professionalism. Moral satisfaction, a sense of officer duty, prestige in the officer environment, opportunity for career advancement, and worthy moral encouragement according to the regulations held from 6th through 10th places respectively out of ten combat training incentives offered as a choice in the incentives rating.

In the opinion of two-thirds (66 percent) of those surveyed, above all a significant increase in pay for military work can stimulate an improvement in combat training. This dependence is more indirect than direct in nature. But along with the housing problem, there is no more acute problem for the officer today than material and financial support of the family. He must receive the deserved pay for his military work, the main content of which is combat training. The systematic increase in officer pay unfortunately lags behind inflation rates and increases in prices on staple consumer goods. This forces them to do more thinking about finding additional income sources for the family than improving their professional expertise.

The existing pay system levels the work of highly rated specialists and of those without a class rating, and it levels the work of those who serve in a troop echelon where combat training missions are performed directly

and of officers of all possible directorates, establishments and staffs where work is less intensive and conditions of vital activity more favorable. Sociologists and economists proved long ago that with material incentives there is a certain threshold of sensitivity to the amount of monetary reward. A stimulating effect arises if it is at least 25-30 percent of pay. With respect to the premium for a class rating, it does not satisfy 72 percent of respondents.

Thus, the present system of pay for military work weakly stimulates an increase in quality and effectiveness of combat training.

But military-moral values—readiness to participate in combat operations to defend the country, prestige of officer service, conscientious attitude toward fulfilling military duty, constant improvement of professional expertise, an officer's honor and dignity, comradeship and mutual help and so on—are not a bit less important than a material increase for a significant number of officers brought up on ideals of honest, selfless service to their homeland. From this standpoint it is explainable why, despite a change in the motivational and value structure of officers' military activity, 37 percent of them consider an increase in professional expertise to be their duty. It is only a pity that these spiritual foundations of officer service, not supported by an adjusted system of education both in society as well as in the Army, are gradually being eroded and losing their weight in the officer environment.

It must be admitted that the old system of values essentially has been destroyed. Today we need a precisely formulated national set of spiritual, patriotic and military-professional values and ideals which could become the foundation of education in the Russian Army. The priority of a highly rated specialist and professional officer whose work is encouraged by the state worthily and in a balanced manner both morally as well as materially must become one of its elements.

The solution to social problems of officer combat training that have been noted depends chiefly on timely, cardinal steps at the highest levels. Nevertheless, even at the troop level there are sufficient directions, ways, methods and forms of social management of the combat training process. In their orders, for example, certain commanders present as an incentive to the best officers instead of to negligent officers a portion of the one-time monetary reward based on the year's results. But capabilities of such a material incentive measure are very limited for understandable reasons.

Today it is becoming obvious that under conditions of the dynamic social-economic situation and conduct of military reform, it is impossible to achieve a substantial activation of officer combat training without a timely solution to social problems of military work.

Again About Security of Our Posts

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[Article by Colonel Sergey Leonenko, candidate of military sciences]

[FBIS Translated Text] An analysis of incidents which have been occurring on the grounds of military garrisons and at installations in recent years permits asserting that new missions have arisen that are nonspecific for troops. These missions most likely can be linked conditionally with opposition by garrison personnel to psychological actions and provocations on the part of the local populace, with the repulse of attacks made by armed groups attempting to seize hostages, weapons and so on, and with a fight against large bandit forces penetrating onto a military post to capture it.

Actions against a garrison usually are conducted by surprise or are developed successively with growing intensity. Hence it is not difficult to draw the conclusion that purposeful preparation of each military garrison located on the territory of other countries, especially in so-called hot spots, is necessary for performance of a dual mission—the combat mission according to the authorized purpose and a nonspecific mission for opposing extremist actions. And inasmuch as these actions are likely on the territory of other countries, it is advisable to consider the situation of our garrisons there as special and to consider an exacerbation of the situation around them as an emergency situation. Therefore the preparation itself of a garrison for actions in emergency situations also must be special and supported by fulfillment of a number of conditions.

First of all, it is necessary to master the situation and forecast its further development. This is facilitated by a knowledge of the language, customs and way of life of the local population and the ability to get into contact with them quickly. Work with regional authorities and self-government institutions to explain the goals and nature of activity of our troops and installations and the lawful nature of their presence on a given territory can be deciding. Frequent meetings, contact with local residents and feasible assistance to them are useful.

Secondly, it is important to strive for psychological stability of garrison personnel. This is possible only based on the high professionalism of privates, NCO's, warrant officers and officers and their firm knowledge of their missions and methods of performing them. Each serviceman, specialist and family member must realize that they are representatives of Russia and are under its protection.

Thirdly, structures and utilities of the military post or installation must be prepared for effective opposition to extremists. Fulfilling this condition is the most labor-intensive. It demands specific material costs, which are especially appreciable due to the autonomous nature of garrisons in host countries.

The majority of military posts were not designed especially for emergency situations, but were formed based strictly on peacetime requirements. And in wartime the sole requirement placed on the construction of posts was assurance of a rapid movement of troops out of them in response to a combat alert.

The present situation forces garrison commanding officers to evaluate the degree of protection of military posts in a new way and to analyze questions of survivability and possibly also impregnability of installations. It is worth having a detailed diagram of the garrison layout. Subsequently this will help advantageously distribute available forces and assets to positions and structures and provide for maneuvering them in emergency situations, which is especially important if the effective combat strength of a subunit or unit is not large and the territory to be secured is vast and unprotected. For example, the capabilities of a radio transmitting center are incomparable with those of a motorized rifle or tank battalion, and so there has to be a comprehensive comparative analysis of terrain and installations simultaneously with an assessment of the combat potential of friendly and extremist forces and assets. This will permit determining methods by which extremists attain set goals and will permit thinking out methods of opposition. The latter, coordinated by time, will become the basis of the decision for employing friendly forces and assets in emergency situations. The decision is prepared in the form of a garrison security and defense plan (for actions in emergency situations). It should include the following: procedure (or a diagram) for placing the garrison in different conditions of combat readiness; allotment of battle tasks for personnel and equipment; communications and warning diagram; signal table and other information necessary for command and control and coordination.

After the plan has been approved by the senior commander, the garrison commanding officer communicates it to subordinates in the form of missions, organizes a study of the missions, and holds special exercises which can be accomplished with officers in the form of practical problems based on the garrison. Various training drills are held with personnel on occupying and mastering places, posts, positions and shelters, specified with consideration of the degree of protection, possibility of good observation and conduct of fire, and stable command and control.

This tentative preparatory complex can be corrected with consideration of local features, but in any case it is called upon to support further work of securing the garrison territory and utilities.

First and foremost, fences must be strengthened; however, this may cause nonacceptance, to put it mildly, on the part of local authorities and a corresponding reaction from extremists. Therefore only partial additional preparation of fences (only from the inside) is the most acceptable. Thus, gaps in concrete or brick fences are

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sealed up and open-work metal or wooden fences are strengthened from the inside with inclined posts (against ramming or toppling by heavy vehicles). Fences which can be penetrated are additionally strengthened by barbed-wire entanglements and by low wire entanglement elements; in addition, wooden fences are impregnated with fireproofing agents. Gates also are reinforced against ramming and are duplicated by others on the inside to a depth of up to two-thirds of the length of heavy vehicles, representing a trap for them. At the same time, various kinds of portable obstacles (knife rests, hedgehogs and so on) can be stockpiled in the garrison and located near dangerous places.

And an additional inner fence duplicating the outer fence serves as a highly effective means of additional protection. If the unit has no capabilities for this, it is advisable to prepare low wire entanglement sets to rapidly isolate breaches and holes in the outer fence. Such sets perhaps will turn out to be the only means impeding the movement of armed groups which have penetrated if the low wire entanglement is deployed in passages between adjacent buildings around the perimeter. It is possible to quickly create internal "rings" of defense when one is forced to abandon buildings located nearer the outer fence.

A feature of the outside of garrison fences in host countries is the emphasized marking of their state affiliation. In my view, the presence of the State Flag and Russian Federation Emblem is mandatory here as symbols of international inviolability, which means symbols of psychological effect on extremists. Signs are needed warning of the garrison's special situation and its protection by Russia. Information about corresponding agreements with the host country government and the liability for violating the inviolability of another country's territory also is possible.

It is desirable to have loudspeaker communications around the perimeter and two-way communications at the checkpoint and at other places of garrison access. In a difficult situation, such measures will permit avoiding the threat of hostages being taken. As a rule, extremists try above all to destroy communications lines and antennas providing communications with the command element, local authorities and militia (police). This basically is done by people who are local residents who have worked or served in a given garrison. Therefore it seems correct to prepare redundant equipment of communications lines for use in an emergency.

Windows of buildings and checkpoints looking out on adjoining streets (or on open terrain) and guard tower openings should be covered by a strong, fine-mesh net stretched on metal frames 15-30 cm away from the wall for protection against grenades, Molotov cocktails and stones. Shutters (removable louvers) and also opaque blinds and possibly sandbags must be provided for on the inside. All this is done with consideration of rapid conversion of windows into firing ports (if necessary). It

is advisable to enclose sentry towers on two or three sides with metal plates with observation slits (similar measures were used successfully in the Western Group of Forces during 1991-1993, when raids and attacks on posts, checkpoints and troop garrisons by groups of neofascist and extremist forces, including with use of firearms, became more frequent). It is also possible to use plywood and canvas to preclude the conduct of aimed fire against sentries. Illumination equipment, especially at posts, should be protected against rapid destruction (by nets and louvers) and, most important, should be oriented so as not to illuminate the sentries, but the installations and approaches to them. Special attention must be directed to readiness of reserve power supply assets and to setting up reserves of fuel and other means of life support.

Water supply sources must be reliably secured; if water is supplied centrally, constantly replenished reserves must be established. All basement spaces must be prepared for accommodating people and must be outfitted with communications equipment. Routes that are least dangerous for the movement of people and the maneuver of subunits must be established on military post grounds.

Having determined that a situation has begun to be exacerbated, the garrison commanding officer and officials must take steps to keep it from escalating to a critical situation (reports to the command element, contacts with local authorities and so on). Simultaneously reinforce observation and involve all kinds of reconnaissance. Reinforce garrison security and patrolling of grounds. Increase the makeup of alert-status subunits (teams), establish officer alert duty in barracks and update the allotment of battle tasks at least twice a day. Move people working in offices whose windows look out onto the street into more protected offices. Leave observers (riflemen) in the abandoned spaces.

If extremists prepare and hold rallies and mass demonstrations, the command element should hold talks that are correct in form and balanced in content with the heads of people holding rallies. If talks produce no results, the garrison commanding officer can give instructions for placing alert-status subunits in heightened combat readiness, possibly outfitted with shields, helmets, clubs and other special equipment. It is possible to appeal simultaneously to those holding rallies and inform them about violations of international agreements, liability for illegal actions and the garrison's readiness to use weapons. Talks must be held constantly; force may be used only in case extremists penetrate onto garrison grounds. The garrison commanding officer reports use of force to the senior commander and further acts at his direction or according to an approved instruction. Local authorities and the militia (police) are informed, and what is occurring is documented and photographed throughout all the events.

Fire engines, water cannons, trip flares, smokepots and smoke grenades can be used to neutralize a crowd that is in an aggressive mood.

When a conflict escalates to an armed attack or arises suddenly, personnel must take their places according to the allotment of battle tasks, in readiness to conduct fire. Fire can be only answering fire and can be used only against armed bandits and only after attackers receive an appropriate warning. The garrison's armed reserve further disperses to the most dangerous sectors or is in full strength in readiness to defend the most important installations.

I will permit myself to disagree with the opinion¹ of the advisability of storing weapons, ammunition and combat vehicles in a single but well secured installation. The fact is, this may prove to be the only target of extremists' actions, which means an increased likelihood of the threat of its seizure. In addition, if such an installation is rapidly blocked the garrison itself hardly will manage to make use of its own weapons. If weapons must be stored in one place based on the interests of service, however, it is possible to do this, but after having removed certain parts such as the trigger mechanism from small arms, to be stored separately. I assume that such a step, although it contradicts all kinds of manuals, will be the only one ensuring the safekeeping of weapons and the impossibility of their immediate use by extremists in an emergency situation.

The worst variant probably will be a large-scale attack, and one, moreover, which has received the support of paramilitary force elements. This is possible if the attackers have suffered losses. In this case the extremists' goal may change, for example, from seizing weapons to totally destroying the garrison. Under those conditions troops will have to conduct full-scale combat operations in isolation and in total encirclement. And the "isolation of any installation for purposes of its subsequent destruction or capture"... is blocking.²

We will note that the main principles of conducting combat operations when there is blocking basically correspond to combined-arms principles of fighting in encirclement. But the presence of family members and civilians in the garrison seriously constrains initiative, for they are the ones who may become the cause of blackmail and psychological pressure on the part of extremists.

It is presumed that blocking of garrisons can be brief (1-3 days) or lengthy (over 3 days), depending on the promptness of a political resolution of the conflict and also the makeup and combat capabilities of garrisons and their distance from each other. In case a political decision drags on, it is the last two factors that can ensure relief of garrisons.

Relief is undertaken for the following purpose:

- to take garrison personnel, employees and their families out from under attacks or destruction;
- to link up with forces of larger garrisons;
- for a subsequent move outside of the host country.

There may be other goals as well, but they are achieved only with observance of the following conditions:

- the ratio of forces and assets should not be more than three times in favor of the extremists;
- organic combat and other vehicles support the simultaneous movement of all personnel and necessary supplies;
- routes provide for rapidly breaking contact with the extremists and for unhampered forward movement;
- support [podderzhka] of the relief by other combat arms and comprehensive support [obespecheniye] are mandatory.

Relief may be independent or in coordination with forces of other garrisons. For example, a rather strong garrison reserve, essentially an assault team, breaks through the blocking noose, some of the forces cover the flanks and, forming a "corridor" closed on three sides, support the forming up of the column with people and supplies. Subunits battling on the garrison perimeter inflict damage on opposing extremists, then are removed from positions, board the transport (fighting vehicles) and rush behind the main body, making up a rear guard. Equipment, supplies and excess arms are destroyed. Movement is made in a formation similar to readiness to enter battle, i.e., with assignment of appropriate elements.

After independent relief, a more powerful garrison may crush (suppress) from the move the forces and assets blocking another garrison, supporting its breakout or linkup. That method is possible only on condition of precise coordination of forces and stable communications.

But it should be noted that any combat operations with use of weapons are extremely undesirable. And only an analysis of a specific situation and creative work of commanders at all levels based on precise directions of the higher command will ensure making the optimum decision for executing assigned missions.

Footnotes

1. VOYENNNYY VESTNIK, No 2, 1994.
2. "Slovar voyennykh terminov" [Dictionary of Military Terms], 1989.

EQUIPMENT AND ARMAMENT

Everything That Burns Will Do

95UM0166J Moscow ARMEYSKIY SBORNIK
in Russian No 5, Nov 94 (signed to press
28 Oct 94) pp 52-55

[Article by Colonel Grigoriy Shcherbakov, candidate of technical sciences, and Major Georgiy Saad]

[FBIS Translated Text] *The question of whether or not a fighting vehicle engine should operate on different kinds of liquid fuels of petroleum origin was decided long ago: it should.*

The experience of local wars and armed conflicts has shown that under present-day conditions using military equipment with multifuel engines permits substantially facilitating support to troops in performing their missions and permits increasing the autonomy of subunit operations.

It should be noted that although there are appropriate devices in power plants, a diesel engine's operating cycle on light fuels (jet fuels and gasolines) has a number of features which must be taken into account in the process of operating military equipment. And strict compliance with the rules of operating combat vehicles on different fuels is mandatory for preserving engines' high reliability and constant readiness for use for their immediate purpose.

Light fuels are characterized by a higher ignition temperature compared with diesel fuels, which in turn depends on engine cylinder pressure. In addition, the ignition-delay period also is longer. Under conditions of multiple-center ignition characteristic of diesels, this leads to an increase in rough engine operation and in maximum fuel combustion pressure in the cylinder. To avoid very rapid wear and failure of parts and to increase their service life, manufacturing plants are introducing restrictions on the amount of operation on light fuels (Table 1).

Table 1

Diesel Makes	Fuel Grades	Accrued Time, hrs
*V-46-6, *V-84-1	TS-1, T-1, T-2, mixtures with diesel fuel	Not over 100
**UTD-29B	TS-1, T-1, T-2, mixtures with diesel fuel	Not over 150
	A-72, A-76, AI-93, with additive	Not over 100
*5TDF	TS-1, T-1, A-72, mixtures with diesel fuel	Not over 130
	A-76, mixtures with diesel fuel	Not over 100
*6TD	TS-1, T-1, jet fuel, A-72, A-76, mixtures with diesel fuel	Not over 100
	AI-93 in mixture with diesel fuel (at least 25 percent diesel fuel)	Not over 50

Note: *—Cumulative accrued time; **—Accrued time within warranty period.

The deputy commander for armament monitors observance of these restrictions and rules for operating fighting vehicles. Thus, after tanks are filled with light fuels, he makes the following entry in the vehicle maintenance log (in the "Special Notes" section): "Engine readjusted for operation on jet fuel (gasoline) . . . with running time meter readings . . . Date. Signature."

Features of the structural design of multifuel diesel fuel systems are determined by physical-chemical properties of fuels used. Thus, jet fuels and gasolines have lesser density compared with diesel fuels. Therefore, with the cyclic feed volume V_c (mm/cycle) of different fuels to the

engine cylinders unchanged, the cyclic feed mass g_c (grams/cycle) of light fuels decreases proportionate to their change in density ρ_{fuel} (grams/mm), i.e., $g_c = V_c \rho_{fuel}$.

A corrector is provided on military vehicle diesel engines for changing the cyclic fuel feed volume and consequently also the cyclic fuel feed mass with a transition from one kind of fuel to another. A block diagram of a T-72 tank fuel system and the corrector device (in the form of a three-position stop of a high-pressure fuel pump rack) of V-46-6 and V-84-1 engines are shown in Fig. 1.

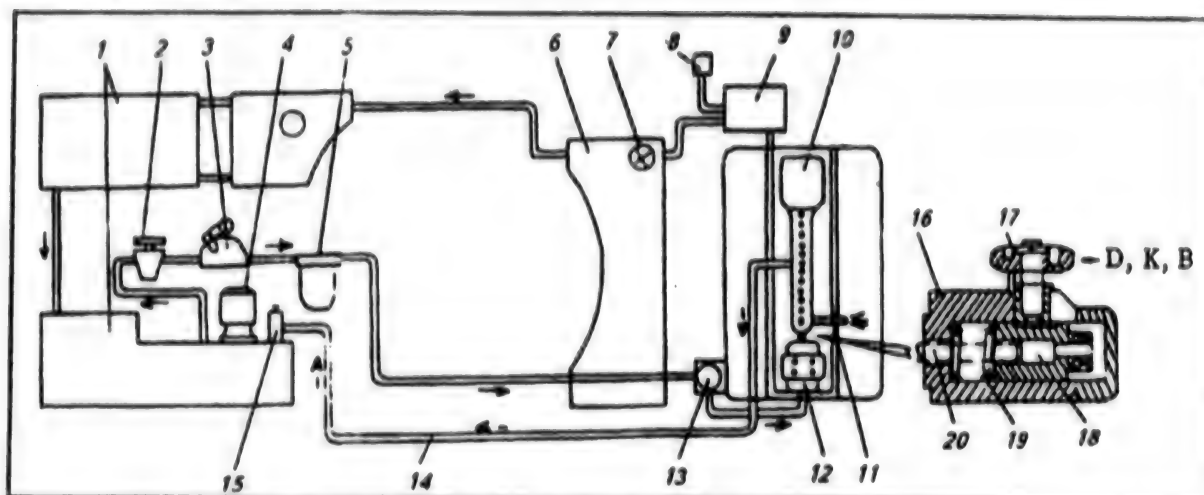


Fig. 1. Feed system of V-46-6 and V-84-1 multifuel diesels:

Key:

- | | |
|-------------------------------|-----------------------------------|
| 1. Front tanks | 11. Injector |
| 2. Fuel distribution cock | 12. Fine filter |
| 3. Manual fuel booster pump | 13. Fuel booster pump |
| 4. BTsN-1 centrifugal pump | 14. Drain line |
| 5. Coarse filter | 15. Air release valve |
| 6. Middle tank/rack | 16. Cyclic feed corrector housing |
| 7. External tank shutoff cock | 17. Handwheel |
| 8. Floating valve | 18. Stop |
| 9. Expansion tank | 19. Spring |
| 10. High-pressure fuel pump | 20. NK-12M pump rack |

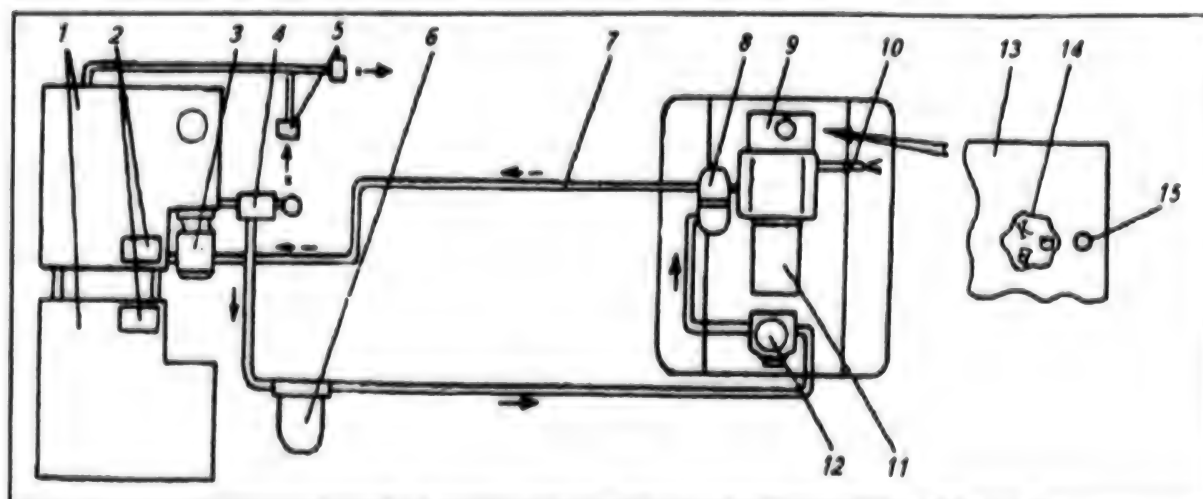


Fig. 2. UTD-29B multifuel diesel feed system:

Key:

- | | |
|--|---|
| 1. Tanks | 8. Fine filter |
| 2. Tanks with TsGN [cyclohexyl nitrate] additive | 9. High-pressure fuel pump |
| 3. BTsN-1 centrifugal pump | 10. Injector |
| 4. Fuel cock | 11. Automatic clutch for changing fuel feed advance angle |
| 5. Drain valves | 12. Fuel booster pump |
| 6. Coarse filter | 13. Housing of high-pressure fuel pump fully variable regulator |
| 7. Drain line | 14. Handwheel |
| | 15. Bolt |

When fueling with fuel of lesser density, rack travel and the position of stop 18 are changed toward an increase by turning handwheel 17. The letters D [diesel], K [kerosene] and B [gasoline] on the handwheel corresponding to the kind of fuel put in must be on top.

The very same principle for correcting cyclic fuel feed is used for the UTD-29B engine (Fig. 2). The letter on handwheel 14 must be opposite bolt 15, which is screwed into the fully variable regulator housing.

On vehicles with 5TDF and 6TD diesel engines, cyclic feed of light fuels is increased by changing the position of the regulating bolt of the carriage on the drive lever of high-pressure fuel pump racks.

It should be remembered that if vehicle tanks are filled with mixed fuel, the handwheel must be placed in a position corresponding to a heavier fuel, otherwise an increase in cyclic feed also will cause the process of the mixture's aftercombustion to lengthen, which will lead to the diesel overheating. The increase in heat carried off with exhaust gases may entail a disabling of the gas turbine (5TDF and 6TD), exhaust collectors (V-46-6, V-84-1) or ejector box (UTD-29B). Fire may break out due to a sharp temperature increase in the engine-transmission compartment.

But full compensation of cyclic feed of light fuels is not assured despite correction, in connection with which diesel power drops and the vehicle's tractive characteristics are reduced. In addition, fuel consumption increases (Table 2).

Table 2

Diesel Makes	Kinds of Fuel			
	Jet		Gasolines	
	Decrease in power, %	Deterioration of economy, %	Decrease in power, %	Deterioration of economy, %
V-46-6, V-84-1	10	8	15	14
UTD-29B	3	2	16	8
5TDF	10	-	20	-
6TD	20	-	25	-

One other feature of light fuels is an absence of lubricating qualities. Therefore to improve working conditions of fuel feed apparatus elements (precision pairs and injectors), oil from the engine lubrication system is delivered to them under pressure through drillings in the pump housing.

Due to low viscosity of light fuel, it is possible a certain amount will seep through clearances in precision pairs. Sectional grooves on fuel pump plungers and on injector nozzle needles help avoid this. Fuel returns to the system from the grooves.

In operating a combat vehicle on light fuels, it is necessary to take into account that again, due to low viscosity of this kind of fuel, it gets into the engine crankcase, diluting and oxidizing the oil. This leads to a more rapid deterioration of its lubricating properties than when operating on diesel fuel and to the necessity for periodic replacement.

Rational heating conditions should be observed when operating on gasolines. It is recommended keeping the lower limit of coolant operating temperature 10° higher than when operating on diesel fuel. The fact is that conditions for dependable ignition of the working mixture deteriorate with low loading conditions due to insufficient temperature at the end of the compression stroke. As a result, the engine operates unstably. To keep this from happening, it is recommended that minimum crankshaft speed on idle be set approximately 200 rpm higher than when operating on diesel fuels (400 rpm higher for 6TD diesels when filled with a mixture of AI-93 gasoline and diesel fuel).

One other problem is that engine starting is made more difficult with the transition from diesel to light kinds of fuel. This is connected with the fact that for dependable ignition of gasoline in the cylinders it is necessary to create a higher temperature and higher pressure than in the case of diesel fuel. Therefore before starting the engine on gasoline, it must be warmed up with the preheater beforehand with an outside air temperature of 25°C or below (as in winter).

Because of the fact that light fuels have a low boiling point (gasoline boils at 35°C), the formation of steam locks is possible in lines and other fuel system elements, causing engine shutdown. For their effective removal, the fuel system of multifuel diesels is designed as a continuous-flow system. In addition, a centrifugal fuel pump is included in it to create an overpressure in the section from the fuel tanks to the engine's fuel booster pump.

Thus, fuel circulates constantly in the system; a portion of it goes to high-pressure fuel pump sections and a portion (which incidentally carries off accumulated air and steam) returns to the tanks. Continuous-flow fuel also is used to operate the thermal smoke apparatus. It should be remembered that use of thermal smoke apparatus is not recommended when operating on jet fuel mixtures because a poor-quality smoke screen forms, and it is categorically prohibited on gasolines, since a gasoline explosion is possible in the exhaust path.

Diesel fuel and gasolines differ substantially in the thermal expansion coefficient. This must be taken into

account when fueling vehicles with gasoline. Thus, auxiliary fuel tanks in the T-72 tank are not connected to the fuel system and those already connected are not filled with gasoline. It is recommended that in this case the amount of fuel be measured indirectly using a measuring rod, not remotely by an electrical sensor and needle indicator, to avoid the outbreak of fire.

In the UTD-29B normally aspirated diesel, pressure and temperature of the working mixture at the end of the compression stroke are insufficient for dependable gasoline ignition. To decrease the self-ignition delay period of the gasoline-air mixture, cyclohexyl nitrate, an additive which performs the role of an additional oxidizer, is added to the fuel system during fueling. Its makeup includes loosely bound oxygen, which is given off easily in an active state with the compression temperatures characteristic of normally aspirated diesels. In other words, the cetane number of gasoline is increased.

Cyclohexyl nitrate is added to gasoline in the following amounts (% by weight): A-72—1, A-76—2, AI-93—2.5. It is stored on the vehicle in two tanks (with a capacity of 11 liters) accommodated in the fuel tanks. The mixing of gasoline with the additive directly in the tanks is allowed in the process of operation. For this, 100-150 liters of gasoline are placed in the vehicle, half of the design norm of the additive is added, and the BTsN-1 pump is turned on. Then, without turning off the pump, gasoline is added to half of the volume, the second half of the design norm of additive is added, and then gasoline again to the norm. If unused diesel fuel remains in vehicle tanks at the moment of fueling, gasoline is added in the very same sequence, excluding addition of the initial norm (100-150 liters) of fuel. In this case the three-position stop handwheel on the UTD-29B diesel must be placed in the B [gasoline] position.

In exceptional cases, in addition to pure gasoline (or gasoline with an additive), use of gasolines is allowed in multifuel diesels with the addition of M16-1KhPZ, MT-16p and MTZ-10p oils in the following amount (% by volume): A-72—5, A-76—25-30, AI-93—35. The procedure for adding oil is the very same as for adding the cyclohexyl nitrate additive. The high-pressure fuel pump three-position stop handwheel is placed in the D [diesel] position.

MILITARY SCHOOL: DEVELOPMENT AND PROSPECTS

Education of Communicators Is Competitive

95UM0166K Moscow ARMEYSKIY SBORNIK
in Russian No 5, Nov 94 (signed to press
28 Oct 94) pp 56-60

[Interview with Lieutenant General Georgiy Georgiyevich Savin, chief of Military Signal Academy, on eve of Academy anniversary, by ARMEYSKIY SBORNIK correspondent Colonel Yuriy Churkin, date and place not specified; photograph of Savin included]

[FBIS Translated Text] *The Military Signal Academy was established on 8 November 1919. It is a higher military educational institution and major scientific research center on problems of communications and automation of command and control processes.*

In 75 years around 28,000 commanders and engineers of the Soviet and Russian armies have graduated from the Military Signal Academy. Eighty-five doctors and 1,825 candidates of sciences have been trained. Among them are Heroes of the Soviet Union, marshals of combat arms, well-known signal generals, prominent scientists, academicians and corresponding members of various academies of sciences, State and other prize laureates, honored figures of science and engineering, and ministers. Officers of armies from countries of the near and far abroad also have gone through training courses here.

On the eve of the Academy's jubilee an ARMEYSKIY SBORNIK correspondent met with its chief, Lieutenant General Georgiy Georgiyevich Savin.

[AS] Comrade Lieutenant General, first of all on behalf of our readers and for myself personally, allow me to congratulate you and the entire Academy collective on the 75th anniversary of its work. In your view, what is the meaning of reorganization of the existing military education system as applied to the Academy?

[Savin] Put briefly, the reorganization is dictated by recent familiar transformations in the country. The military education system could not help but react to these events. And the important thing here in my opinion is that essentially everything changed on which the concept of training previously was structured.

The goals and missions of reorganization generate no special objections on my part, but it would appear that far from optimum methods have been chosen, such as excessive centralization of all and everything, as they say. Heads of educational institutions essentially cannot decide many material-technical and administrative questions independently.

The military education system should have been improved long ago. Many problems have accumulated here. Take higher military signal schools for example. The officer training system formed in them in such a way that a cadet had to master theoretical knowledge in various directions and in a very broad spectrum. And so it turned out that after completion of training he seemingly knew a great deal, but was unable to do very much, since the role of practical training for graduating a specialist of a certain profile had been depreciated. There is no question that it is no simple matter to find the "golden mean" here, but it also was impossible to be reconciled with that situation.

With respect to the higher military education officers receive in the Academy, it too is far from perfect. For example, to this day unfortunately our curricula and training programs clearly are overloaded with general

philosophical questions, but there is not enough training time for that which is indispensable.

Finally, in my view serious gaps in social-humanitarian training of communicators are a common shortcoming both of school as well as Academy education. Hence also a certain dissatisfaction of our graduates over the training process.

[AS] Will the situation change for the better with the inclusion of military education in the country's overall educational system?

[Savin] I hope so. We are doing everything to see that the signal officer's military education corresponds to state educational standards to the maximum extent.

[AS] Georgiy Georgiyevich, tell me, have we managed to achieve something in this direction?

[Savin] Training is being reorganized based on a concept for training signal officers developed in 1991. Its basis is a strengthening of fundamental training and an increase in the professional level of graduates of command and engineering specialties who are called upon to make competent decisions under all conditions.

The training process is structured in three stages. Students' humanitarian, military and specialized training is ensured in the first stage (fundamental level). In the second stage (basic level) students are trained to perform functional duties in primary positions in accordance with requirements of skill characteristics regardless of our graduate's upcoming place of duty. Finally, in the third stage officers learn to act in the position in which they will serve in the troops.

I will note that this year was the first graduation of students whose training was carried out under curricula and training programs realizing this concept.

[AS] Today much is said and argued about continuous education and individual training. Is it possible to accomplish this in practice?

[Savin] Well, you will not call this a simple problem, and it is very good that this idea was laid down in the new concept of training officer cadres. It is presumed that continuity of education will be accomplished according to the scheme: military school/troops/Academy/troops/refresher training and skill enhancement faculty/troops. And individual training can be ensured through wide use of individual curricula by advanced cadets and students. I am convinced that the latter form should become the basis during training in the refresher training and skill enhancement faculty.

[AS] You did not mention yet another form of training—by correspondence. They say it has become obsolete. Do you agree?

[Savin] In my opinion, correspondence-course training will help train officers for the Signal Troops in the transition period of military school reform. In addition,

it will attract those commanders and engineers who have limited growth prospects in their unit or post, i.e., those who have normal housing, but fear losing it on entering the Academy's on-campus department.

[AS] We know that free attendance at lectures has been introduced in the country's higher educational institutions. Does this extend to the Academy?

[Savin] We welcome such a form of training, but in contrast to civilian higher educational institutions, the Signal Academy has a precise list of specialties in which student training is conducted. The training process thus is structured in accordance with this mission. Therefore by receiving systemized material in lectures, our trainee shortens the time for assimilating it. Moreover, lectures cite examples from troop practice in organizing communications and automation. Consequently, the material often depends on conditions and at times becomes quickly outdated. Therefore a student who misses class may miss something important. True, we can permit students in the second and third courses to go over to an individual training plan both for individual training disciplines as well for groups of them or for all of them. But for now we deem it inadvisable to extend this form to other trainee categories for reasons indicated above. Now only one student of the Academy's Engineering Faculty (Major D. Nenadovich) is studying under an individual plan, and he already has defended a dissertation for the academic degree of candidate of technical sciences.

[AS] Comrade Lieutenant General, are new information technologies being introduced to the training process in your military educational institution?

[Savin] We have a rather large inventory of computer equipment: a unified computer system, SM [not further expanded] computer, around 200 personal computers, 8 display classrooms and 7 personal computer classrooms. It is of no small importance that display systems connected with the unified computer system operate in all faculties and in certain chairs. Further, a computer station has been set up in the training department by which tasks of planning, monitoring and managing the training process are being performed successfully. It would appear that we should be satisfied, but it is distressing that the majority of personal computers are not covered by the table of organization and over 60 percent are obsolete models. We have drawn up and already are introducing a concept of a unified, automated training and management system. It is being realized as the aggregate of two interrelated subsystems: the Academy automated control system and the automated training system. The first steps in using information technologies already are producing rather good results.

A rating system for evaluating student and cadet progress has been in experimental use since September 1991 in support of management of the training process.

The experiment has proven to be unquestionably useful, since it energizes the trainees' work. Now the system is being modified, which will permit evaluating not only training work, but also military-scientific as well as mass sports work.

In general, the Academy uses around 60 automated curricula and training programs in support of training.

[AS] Georgiy Georgiyevich, how is the scientific level of instruction being elevated? What is being done for career and scientific growth of instructor personnel?

[Savin] I will note with satisfaction that our teachers work intensively to provide quality training for students and cadets under the new training system. We have two specialized candidate councils and one doctoral council in operation. They prepare up to 60 post-graduates and 10-15 degree competitors per year. In addition, up to 80 instructors of signal schools and of the Academy have undergone training in the refresher training and skill enhancement faculty during this period.

With respect to questions of advancement up the career ladder and an increase in teachers' pay, we make this dependent on the officer's scientific growth.

[AS] Some civilian higher educational institutions train scientific workers in a master's work program. How is this question resolved for military communicators?

[Savin] In 1994 we had the first graduation of research engineers whose training was conducted under programs very close to master's programs. Moreover, we plan to begin preparing masters directly in the Academy in the specialties "Telecommunications" and "Information Science and Computer Engineering." An overall concept for their training already has been developed. It envisages two stages realized in succession—baccalaureate (four years) and master's (two years).

[AS] It would appear there can be no doubt that teachers have an excellent knowledge of equipment, but how is their level of practical work on communications equipment checked and evaluated?

[Savin] The requirement not only for superb knowledge of equipment, but also for its skillful operation has been made the basis of staffing the Academy with professors and instructors. Practical skills of officers of this category in working on communications and automation equipment are checked regularly in practical classes. And if new gear arrives, its mastery is organized in the chairs in hours of command training.

[AS] Georgiy Georgiyevich, in conclusion we would like to learn your opinion about whether or not our military education of signal officers is competitive.

[Savin] It is difficult to respond unequivocally. Judge for yourself. Up until 1992 signal officers from many world countries trained in a special faculty at the Academy. In the opinion of students who received primary officer education in colleges of France, Italy, Great Britain and

the United States, the specialist training level in our military educational institution meets modern requirements. One also can judge the level of knowledge acquired in the Academy from the following fact: after the GDR Volksarmee was disbanded, signal officers who completed our educational institution were appointed to high leadership positions in the FRG Signal Troops apparatus. In developing new curricula and training programs, we try to take maximum account of the latest achievements in the field of world pedagogic science.

Evaluated on the whole, our military education of signal officers is fully competitive.

[AS] Comrade Lieutenant General, permit me to thank you for the discussion and once again to congratulate the Academy collective and wish new successes in training highly professional cadres of military communicators and in scientific work.

What Did the Research Show?

95UM0166L Moscow ARMEYSKIY SBORNIK
in Russian No 5, Nov 94 (signed to press
28 Oct 94) pp 61-65

[Article by Major Igor Obratsov, candidate of sociological sciences, Russian Federation Armed Forces Center for Military-Sociological, Psychological and Legal Studies]

[FBIS Translated Text] In the period from February through July 1994 the Russian Federation Armed Forces Center for Military-Sociological, Psychological and Legal Studies conducted a sociological study in 18 Russian Federation Ministry of Defense military educational institutions. There were 900 cadets and 100 officers (training platoon commanders, course chiefs and instructors) surveyed under a unified methodology.

The studies confirmed a trend toward a drop in prestige of Army service. This also is indicated by a decline in the number of civilian youth wishing to enter military schools (competition for Russian Federation Ministry of Defense higher military educational institutions was 2-3 persons per slot in 1988, 1.5 in 1992 and 1.35 in 1993). According to data of the Center for Study of Population Employment, young men who were seniors evaluated the prestige of the officer profession, among other specialties, at 5.5 conditional points (on a 10-point scale) in 1980. This figure presently has dropped to 3.9.

Young men's motives for entering military educational institutions also have changed (Fig. 1).

Aims of a mercenary nature (opportunity to financially support a family, obtaining social benefits and guarantees, obtaining a specialty necessary under civilian conditions and so on) come to the foreground in the structure of motives for entering higher educational institutions. Against this background, a realization of one's participation in defense of the homeland becomes

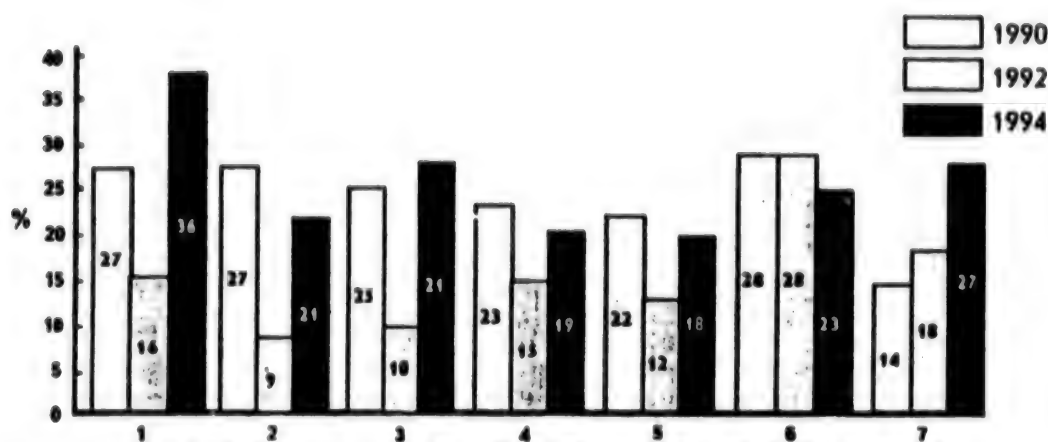


Fig. 1. Dynamics of motives for entering higher military educational institutions:

Key:

1. Prospects for attaining a high financial position
2. Sense of personal responsibility for the Motherland's destiny
3. Romance of officer (Army, Navy) service
4. Desire to continue a family dynasty
5. Personal inclination for order, discipline and an organized rhythm of life
6. Interest in military equipment
7. Chance to obtain a higher education difficult to acquire under civilian conditions

less and less pertinent and fades into the background. Growing pragmatism not reinforced by high patriotic feeling engenders phenomena and processes which we previously did not have occasion to encounter in studying servicemen's value orientations. Thus, in conducting the survey it was learned that some cadets are inclined to view seriously the prospects of their service as a mercenary in the armed forces of states both of the near abroad (Armenia and Azerbaijan) as well as of the far abroad (Yugoslavia) and other "hot spots."

It is indicative that motives of a material direction are predominant for cadets from among first-term servicemen when they enter school and they are distinguished by greater pragmatism of aspirations. Characteristic among Suvorov (Nakhimov) cadets is a desire for discipline, organization and order and the predominance of romantic aspirations. Along with prospects for achieving a high material position, participation in defense of the Motherland and the chance of obtaining a specialty which comes in handy in civilian life are significant motives for cadets from among the civilian youth.

The overall aim at pragmatism was reflected in the more balanced evaluations given by cadets of the status of the training process and the quality of knowledge and skills acquired in school. Thus, essentially every other one surveyed noted that on the whole he is satisfied with organization of the training process. In answering the question of how reforms being conducted in society and in the Armed Forces were reflected in the life of military educational institutions, every fifth person on the average names the improved organization of the training

process and everyday social support and the increased level of instructional and educational work (Fig. 2).

Two-thirds of cadets surveyed noted that their previous impressions of military service and the military profession (before entering the military educational institution) had been borne out fully or partially during the period of school training. At the same time, the number of those disappointed in the chosen profession dropped from 40 percent in 1992 to 28 percent in 1994. Every other person (including the overwhelming majority of cadets who lived in a rural setting before entry) expressed a firm wish to continue service in the Armed Forces after completing the military educational institution. The number of cadets who expressed a desire to leave military service (leave the school) in the process of study or to be discharged immediately after completing the military educational institution was no more than 6 percent of those surveyed, with 23 percent undecided. In connection with the introduction of a contract system, the process of cadet dismissal from military educational institutions because of a lack of desire to study (in previous years the most pressing problem) tended to stabilize, and this is especially characteristic of senior courses.

At the same time, cadets noted a number of shortcomings in organization of the training process. Two-thirds of those surveyed were dissatisfied with the amount of training time set aside for acquiring and improving skills of working on equipment and armament; every fifth one notes the obsolete material-technical facility, insufficient

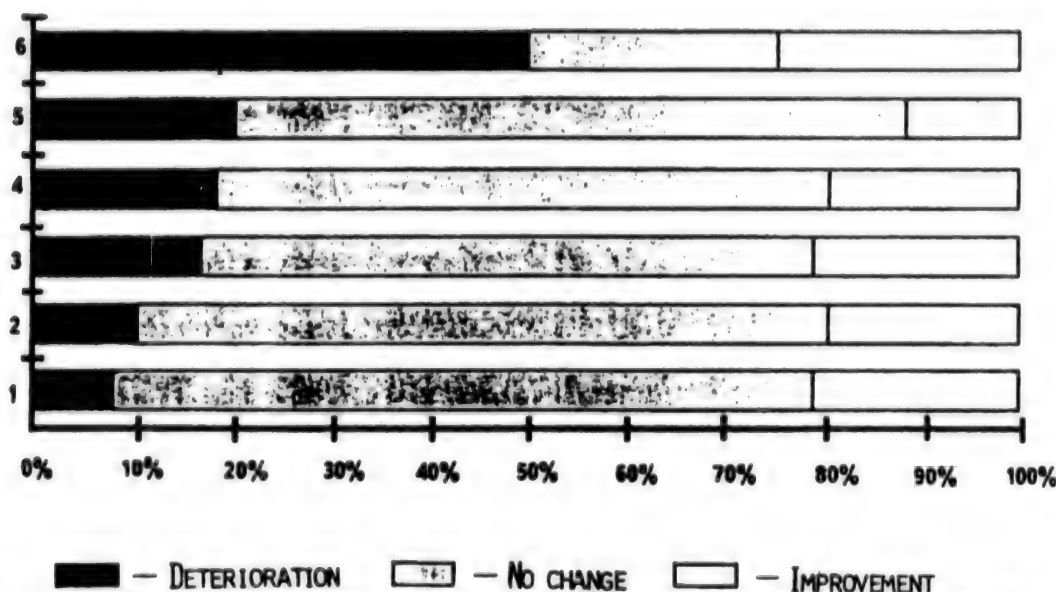


Fig. 2. Nature of changes which occurred in military educational institutions during 1992-1994 (opinion of cadet personnel):

Key:

1. Quality of instruction
2. Organization of the training process
3. Organization of troop duty
4. Quality of educational work
5. Daily routine
6. Everyday social support

attention to the practice of working with people, and poor use of modern forms of training in the training process.

A certain drop in the level of politicization of cadet personnel has occurred of late: while in 1993 12 percent of cadets surveyed considered themselves adherents of some sociopolitical movement or party, their number presently does not exceed 8 percent. At the same time, the number of cadets who regard themselves as believers has increased from 27 percent in 1992 to 46 percent in 1994. Evidently for now this is more a tribute to a vogue on the part of young people than an ideology or perceived need leading them away from political problems.

The fact that the year 2000 worries officers most today is indicated by proposals they expressed for improving the training and education process and vital activity of cadet

subunits. The possibility of their realization affects not only military educational institution officials, but also state and military management agencies. For example, within the scope of a particular school it is not especially difficult to properly adjust the system of passes from the area for junior courses or to improve officer selection when assigning them to positions in cadet subunits (3-5 years of troop service experience in the school's specialty is a mandatory condition). Precise organization in issuing pay and allowances to personnel also is realistic, as is, by the way, also a prompt solution of the majority of everyday social problems. Locally, as they say, it is also possible to take harsh measures toward protectionism and nepotism that accompany "campaigns" for entry and assignment of future cadets and officers. There also are no excuses for those incapable of organizing worthy leisure time for subordinates or of showing constant concern for young families.

Causes Having a Deciding Influence on the State of Military Discipline Among Cadets

Causes of infractions	Officers	Cadets
Lack of cadets' desire to fulfill their military duty conscientiously	63	32
Unsettled nature of everyday social problems	52	33
Low moral and psychological qualities of candidates entering military schools	44	36
Impossibility of effectively applying existing laws and regulations to strengthen military discipline	44	-
Low level of officers' training for organizing and conducting educational work with cadets	37	23
Protection of violators by influential relatives and acquaintances	-	29
Loss of confidence in the social need for military service	22	21

Problems going beyond the bounds of capabilities of the leadership of military educational institutions are another matter. For example, cadets rightly count on increased time to improve skills in operating authorized equipment and suggest introducing a training and assignment rating system based on that of military educational institutions in prerevolutionary Russia. Young soldiers also talk about the uniform, and in particular consider it necessary to return again to the old model of cadet shoulderboards (with the new shoulderboards they differ little from first-term personnel). There also are other questions of vital activity of military educational institutions which are possible to resolve only through joint efforts of state and military management representatives, but I will make bold to name those of top priority:

1. Immediate development at a state level of a mechanism for practical implementation of the "military package" of legislative acts regulating the normal functioning of the Russian Federation Armed Forces. Accomplishment of measures aimed at effective legal support to all measures of the command element in organizing and conducting a quality training and education process in Armed Forces military educational institutions.
2. Bringing the legislative-legal base regulating performance of contract duty by all categories of servicemen into line with the new conditions. Insertion of specific obligations of the Russian Federation Ministry of Defense and Government into contract text with respect to servicemen. Legislative approval of sanctions and compensations for both sides in case of a breach of contract.

Reinforcement of explanatory work with cadet personnel of junior courses on the procedure and conditions for concluding a contract for further performance of military service.
3. Development of a set of humanitarian and organizational measures aimed at increasing the prestige of the Armed Forces in society and the attractiveness of military service among the youth (organization of advertising activity, the functioning of recruiting stations and schools of military-patriotic education

under military commissariats and military higher educational institutions, and so on).

An improvement in the professional selection of candidates entering Russian Federation Ministry of Defense military educational institutions.

4. An increase in the level of educational work with cadets of military educational institutions. Local organizational support to educational work structures of military educational institutions and training methods support to their activity.

More active involvement of instructor personnel in educational work. Bringing up cadets on the best traditions of the Russian and Soviet Army (wide use of the approaching semicentennial of Victory in the Great Patriotic War, development of individual symbolism of military educational institutions and so on).

5. When making cardinal decisions take into account more widely the opinions and sentiments of the command element, faculty, students and cadets of military educational institutions in order to increase the effectiveness of military education system reform. To this end make it a practice to regularly conduct forecasting studies, monitoring studies and operational sociological studies in military educational institutions. Use study results to upgrade the training and education process.

Precision Weapons: An Alternative to Nuclear Weapons?

95UM0166M Moscow ARMEYSKIY SBORNIK
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28 Oct 94) pp 70-73

[Article by Leonid Malyshev, candidate of military sciences]

[FBIS Translated Text] In an era of very sophisticated technological processes and integration of production, even selective missile and bombing strikes against the most vulnerable places—industrial installations, command and control centers, storage facilities and so on—can inflict damage on any state that is perhaps comparable with the consequences of a nuclear catastrophe and

throw it many years backward in economic development. Armies of many thousands are unnecessary for this; it is enough only to have precision weapons and means of delivering them. The buildup observed in developed countries in rates of development and production of such weapons and their platforms—low-signature aircraft—suggests such conclusions.

The technosphere—the production infrastructure artificially created by mankind—is extraordinarily fragile and vulnerable. With the destruction or damage of its key elements such as atomic electric power stations, state area power plants, petrochemical, chemical, biotechnological, metallurgical and other enterprises, storage facilities, transportation hubs and so on, significant changes are possible in nature and in human society (as they also are with vast natural disasters) which at times are irreversible. For example, major accidents at oil refineries as a rule are accompanied by the combustion of gigantic masses of oil products, by a heat release equal to a nuclear explosion with a yield on the order of 3-5 megatons, and by the rapid spread of centers of fire throughout the enterprise. In the combustion of chemical products, smoke and soot are given off which contain aggressive toxic substances: carbon monoxide, sulphur dioxide, carbon bisulfide, phosgene, prussic acid and so on. Zones of chemical contamination extending tens and even hundreds of kilometers form as a result. Because of a leak of 43 tonnes of methyl isocyanate at a plant in the Indian city of Bhopal in 1984, over 3,000 persons had died five years later, 20,000 became totally disabled and another 200,000 suffer from consequences of poisoning by the highly toxic gas. The Chernobyl tragedy led to radioactive contamination of around 10 million hectares of land and around 5 million persons received increased doses of radiation.

The effect of production accidents on the ecology is comparable in scale with the consequences of massive use both of conventional weapons as well as weapons of mass destruction. For example, the bombings of Dresden, Hamburg and Tokyo during 1943-1945 led to no fewer victims in each of these cities than (with consideration of the consequences) the atomic attacks on Hiroshima and Nagasaki. True, around 30 percent of the people died from the immediate effect of explosions and burns and others perished because of carbon monoxide poisoning.

Today a similar effect can be caused by precision weapons used even on a small scale. Their newest models—Tomahawk sea-launched cruise missiles, Walleye heavy guided bombs, SLAM cruise missiles (with a probable error of no more than 5 m), as well as cluster weapons and fuel-air explosives—underwent a check during Persian Gulf military operations. Not only troops, but also atomic power installations, plants producing chemical, bacteriological and conventional weapons, oil pipelines and storage areas were subjected to combat effect.

Thus, in early February 1991 a plant for producing bacteriological weapons was destroyed in Baghdad. An unknown illness began spreading through the city. Just in the course of two days 50 enterprise security guards died from it and another 100 persons were delivered to local hospitals in a serious condition. Cases of unusual ailments in Basra, Mosul and Timrit [sic] took on the nature of epidemics.

Attacks on Iraqi atomic electric power stations and on plants producing nuclear munitions did not culminate in reactor accidents, inasmuch as the latter were taken out of working conditions in advance. But studies by U.S. scientists indicate that conventional weapon damage to external elements of atomic electric power stations such as lines supplying power to mechanisms of reactor safety systems can lead to destruction of the reactor and to the discharge of a considerable quantity of radioactive fuel to the outside. And simulation of a situation using the example of a storage facility for radioactive waste and spent nuclear fuel in the city of Gorleben (Germany) showed that the destruction of heat removal systems even by a conventional munition is capable of initiating the discharge of up to 90 percent of radioactive elements with an overall activity of around 140 million curies, with more than 10 rems of contamination of territory stretching from 1,500 to 2,300 km and with an area from 237,000 to 410,000 km². These calculations are confirmed by the consequences of the accident at a similar installation near Chelyabinsk in 1957.

Specialists assume that with precision employment of a conventional munition (for compression of fuel elements in a limited volume), a low power nuclear explosion is possible. This in turn will lead to the intensive discharge of components of spent fuel, which even after a year of operation in the reactor acquires radioactivity higher than the initial radioactivity by an order of magnitude.

The following fact also indicates the capabilities of precision weapons. During U.S. Air Force combat operations in the Persian Gulf, two remotely-guided missiles were employed from aircraft for destroying an electric power station. The first was intended for making a hole in a solid wall, and the second for delivering a strike through the hole against the machinery section...

Already the present situation in developed countries of Europe, North America and the Far East, including in those located on shores of the World Ocean, is characterized by the highest concentration of flammable, toxic and radioactive substances on the limited territory of 200 cities with a population of one million or more persons. At urban infrastructure installations, the energy of "potential fuel" of each of the cities is approximately 10,000 megatons. This includes oil and oil products, natural gas, coal, wood, plastics, polymers, industrial organic chemicals and so on.

According to forecasts, by the year 2000 the overall output of atomic electric power stations will be 150 hectowatts/km² in the European part of the former

USSR and in European countries of NATO, and up to 200 hectowatts/km² in the United States (less Alaska). Under those conditions the use of precision weapons even with a conventional filling is capable of causing large-scale production accidents and secondary damage-producing factors accompanying them (explosions, fires, floods, radioactive and chemical contamination). The destruction of key elements of the technosphere of developed countries which are in conflict can lead to irreversible changes both in the natural environment as well as in their production infrastructure, which practically erases the distinction between consequences of using conventional weapons and nuclear weapons.

Military conflicts of recent years have brought to light new "traits" of present and future conventional wars. Thus, the primary efforts of opposing sides most likely will be concentrated on selective destruction of the enemy's economic base in order to reduce direct human victims (out of purely humane motives). Considering the constant threat of enemy use of nuclear weapons (even in the presence of powerful deterrence mechanisms), belligerent groupings will strive for preemptive, massive use of the newest precision weapons in combination with reliable means of their delivery, for there are no restrictions here for now, and the effect can be striking.

Large-scale armed clashes between developed countries in the future can cast doubt on the very possibility of survival of all mankind. Therefore in the future the chief means of waging war will be air-based, sea-based and space-based precision strike systems, the primary elements of which will be low-signature aircraft and long-range cruise missiles with a conventional filling integrated with the newest systems for command and control, information, reconnaissance, communications, prompt input of the flight mission, and vectoring to the target.

In this connection several new tasks at once arise for the world community: creation of reliable means of control not only over mass destruction weapons, but also over the most dangerous kinds of precision arms; development of measures for improving the functioning of ecologically dangerous installations at which accidents in peacetime or their destruction in wartime may lead to global catastrophe; development of international law rules aimed at preventing the destruction of ecologically dangerous industries with the beginning of military

operations and at increasing the liability of states for having a low ecological culture of their economic and military activity.

Msta-S Self-Propelled Howitzer

95UM0166N Moscow ARMEYSKIY SBORNIK
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28 Oct 94) p C4

[Unattributed item]

[FBIS Translated Text]

Technical Characteristics of 2S19 Mount

1. Weight Deployed, t	42
2. Crew	5
Firing from the ground	7
3. Maximum speed, km/hr	60

Armament

1. 2A64 Howitzer:	
caliber, mm	152
maximum range of fire, m	24,700
laying angles, degrees:	
deflection	360
elevation	-4...+68
rate of fire, rounds/min	7-8
maximum permissible rate of fire:	
in first hour, rounds	100
in each succeeding hour, rounds	60
unit of fire, rounds	50
2. Antiaircraft mount: NSVT 12.7 machinegun	
caliber, mm	12.7
range of aimed fire, m	2,000
rate of fire, rounds/min	700-800
number of cartridges in belt	60
laying angle, degrees	-3...+70
unit of fire	300

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**Articles Not Translated From ARMEYSKIY
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00000000 Moscow ARMEYSKIY SBORNIK in Russian
No 5, Nov 94 (signed to press 28 Oct 94) p 1

[FBIS Translated Text] News (Unattributed) ..pp 11-13

In the Given Mode (Unattributed)pp 32-33

Sleep Is No Joking Matter, or Why Do the Military Need
"Secrets" of Chronobiology? (N. Moshkin)pp 40-41

Practical Aviation Course (Unattributed)pp 42-43

A Serviceman's Discipline and Its Psychological Char-
acteristics (V. Perevalov and S. Isayenko)pp 49-51

Russia at Takeoff (Ye. Ruzhitskiy)pp 66-69

State Economy: Lessons of World War I (V. Sutyurin) .pp
74-76

Household Guard Horse Grenadiers (A. Shishov)pp
77-80

Medals of the 19th Century (V. Nikolayev)pp 81-83

Winged "Katyushas" (N. Semirek)pp 84-85

Junkers at Fili (V. Kapistka)pp 86-87

A Worthy Rival (V. Ilin)pp 88-92

Ask and We Answer (D. Ilyakov)pp 93-96

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